SUPPLEMENT.

The Mining Journal,

AILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

HE MINES AND MINING DISTRICTS OF UTAH.

STRICTS OF THE WAHSATCH RANGE—THE COTTONWOODS.

-The Wahsatch Range is an extensive chain of mountains ing the entire territory of Utah in an almost unbroken line for an 400 miles. Their direct course is north-west and south-east t 150 miles, when they diverge and run in a south-westerly n, terminating in the most south-western point of the terri- he Wahsatch Mountains contain, perhaps, the richest and most ve mineral deposits in the world, for not only are the principal own minerals found in almost inexhaustible quantities, but rarer and more precious metals are sufficiently abundant to the attention of capitalists and men of enterprise from all the world, and to gain for Utah the well-deserved title of re house of the nation." There is a large number of regularly ed mining districts in these mountains, containing thousands developed mines, besides innumerable promising prospects, which districts will be considered in proper order, with as escription of the principal mines as space will permit.

e Cottonwood Mining District is situated in the Wahsatch ins, about 30 miles distant from Salt Lake City, in a south- y direction, from which it is accessible by the Utah Southern y to Sandy Station, thence by the Wahsatch and Jordan Valley y to Granite City, which is at the mouth of Little Cottonwood It was formerly a part of the Mountain Lake District, which ganised in July, 1864, and was one of the first mining districts h. A number of locations were made, which were subsequently d to some considerable extent, but the district was compara- very little known, even to residents of the territory. The l boundaries were very extensive, comprising an area of about are miles, which has since been divided into several districts. gust 15, 1868, that portion of it known as Little Cottonwood as organised into the Little Cottonwood Mining District, and w celebrated in both hemispheres as being the home of the renowned Emma Mine. The district is about 10 miles long miles wide, and contains upwards of 2000 claims, besides ous tunnel locations, all of which are continually being worked. rface of the mountains rising on either side of the canon are tely dotted over with locations, and sites are not yet ex- d, for prospecting is still going on. There are two thriving in the camp, Granite situated at the mouth, and Alta City s up the canon, at the base of the celebrated Emma Hill.

e geological formations of this district are strikingly peculiar, ave excited the wonder and admiration of several eminent gists. From the mouth of the canon the different formations presented equally on both sides of the valley in like rotation various belts. The upheaval of granite has broken the over- rocks, and laid them up in the east and west on each side of anite upheaval, but on the west they are not so clearly defined, tand more vertical. Following up the canon on the east the s belts come under observation as follows—granite, Lower an sandstone, blue limestone, a shale of metamorphosed lime- , some evidences of fossil bearing limestone, and finally closing e series at the end of the canon is another upheaval of granite. res are varied in character, but are principally carbonates and tiferous galena; immense veins or deposits of the latter have found, and almost invariably occur in the belt of the limestone ations.

I previously stated, there are upwards of 2000 mining claims umerous tunnel locations in Little Cottonwood. Of the latter rincipal one is the Howland Tunnel, located and established in h 24, 1872, by Mr. W. H. Howland, an experienced Californian ng engineer, and incorporated in San Francisco, California, 6, 1872, with a capital stock of $10,000,000. This tunnel, which igned to penetrate the base of Emma Hill, parallel to its long nters the hill on the west end nearly on a level with the bottom e canon, and pursues a course 18° north of east. It is to be feet in length, and 3000 feet in width, or 1500 feet on each side e tunnel, and in accordance with the United States law it thereby es a *bona fide* title to all the undiscovered lodes, veins, and al deposits of whatever kind cut anywhere in its passage within limits. The tunnel has an elevation of 1 in. in every 30 feet, h secures perfect drainage, and will prevent even the possibility y disturbance from water. The rock formation through which unnel will pass is limestone and quartzite, with strata of sand- e, all of which are worked with moderate facility. The fissures tratification of the hill run about 20° west of north, so the tunnel them at nearly right angles, and consequently crosses the track the veins and lodes on Emma Hill at a very great depth below rface. By tracing the course of the tunnel on a map of Little nwood, published this year, it will be seen that it passes directly r an assemblage of mines, which for extent and value have pro- y no equal within a similar space anywhere in the world, among h are the Flagstaff, Vallejo, Ohio, North Star, West Star, Savage, vatha, Montezuma, Emma, Diamond, Davenport, and many others. epth vertically from the surface works of the Flagstaff is about ft., from the Emma 1200 ft., and from the Davenport 2400 feet. mouth of the tunnel is strongly and permanently timbered, and work has advanced into the hill more than 300 feet, and is going s rapidly as possible. Several small veins of silver ore have dy been crossed, and there is very satisfactory evidence that amounts of rich paying ore will be reached within the next eet. When the difficulties and expense attending deep shaft ng are considered, it is evident that tunnelling possesses many ntages, and this tunnel in particular, on account of its favour- situation. The mouth being on the lowest plane of the hill, and unnel having an inclination of 1 in. outward to every 30 feet, it successfully drain every part of the hill of surface water, with- the least interruption to the regular work of development, besides g a gentle down grade to loaded cars in delivering ores. Another ortant consideration is that ores can be delivered at the mouth any part of the tunnel, at an actual expense not exceeding $1 per while it costs from $5 to $10 per ton to hoist ore from a shaft, o haul it again down the hill, besides the expense of teams and and tear of machinery. The work on the tunnel can be pro- secuted, and all mineral veins operated upon in winter as well as in summer, and consequently neither excavating or delivering ore is subject to interruption from the intense cold, or the deep snow, which are so prevalent in winter in the Cottonwoods. The tunnel also dispenses with the labour and cost of all pack-mules and attendants in hauling food, tools, and other necessary materials up the mountain side, often at an angle of from 45° to 90°, and at an actual vertical altitude of from 1200 to 3000 feet. Much valuable time is lost and progress greatly retarded by these causes in summer, and in many instances work is completely suspended in winter, often occasioning serious delay and losses, which makes shaft mining a laborious and expensive business, particularly if the ore is not very rich in both quality and quantity. In addition to all the mineral deposits within the limits set forth in the claim, this tunnel has a clear title to four acres of ground at its mouth for dumping, and for all necessary buildings. This tunnel is certainly the greatest enterprise in Utah, and may be compared to the celebrated Sutro Tunnel in Nevada. Situated as it is, in a hill that is conceded to be one of the richest ever discovered in any part of the earth, the yield of ore will doubtless continue for generations to come. Entering the hill at the lowest plane, draining and crossing all the lodes and veins at a great depth where experience shows the ores to be richest, and dispensing with costly machinery, it possesses elements of economy not to be found in the shaft system. And from all indications it seems evident that at no distant day in the future all the mines on the line must on account of the accumulation of water in their shafts and in their levels be forced to the necessity of draining, and it will be found a great point of economy, both for the management of the water and the delivery of the ores, to make an outlet for the ores through the Howland Tunnel, which must yield a large income to the tunnel company. The officers of this company are as follows—S. Heydenfelt, president; J. Aron, I. Steinhart, M. Castle, trustees; and W. H. Howland, superintendent and engineer.

The Etna Tunnel was also located, March 24, 1872, by W. H. Howland, and incorporated in San Francisco, April 6, 1872, with a capital of $10,000,000, under the direction of the same trustees and organisation as the Howland Tunnel. It is located on the south side of Little Cottonwood creek, and runs in a south-easterly direction towards the American Fork under the highest part of Etna or Lexington Hill. It is to be 5000 feet long and 3000 feet wide, and also claims all the undiscovered lodes, veins, and deposits of ores within its limits, and four acres of land at the mouth for building purposes. The mouth of this tunnel is on the opposite side of the canon, 1000 feet from the mouth of the Howland Tunnel, and 1500 feet from Alta City. It passes under the famous Wellington and other mines now being profitably worked, is at present 200 feet deep, with work going rapidly forward, and gives very good evidence that large bodies of paying ore will soon be reached. This tunnel has the same advantages possessed by the Howland Tunnel, and appearances plainly indicate that it passes through the same mineral belt. The formation and stratification of the Etna Hill is the same as that of Emma Hill, and as far as been developed there is an almost exact correspondence in character, quality, and value of their ores. A continuance of this tunnel would open into American Fork canon.

The Esther Tunnel, located, May 9, 1872, is in a southerly direction from Emma Hill about 2000 feet, runs due south, and is calculated to cut the continuation of the Emma lode in the Etna Hill. The Wahsatch Tunnel, located, April 25, 1872, runs south-east under the Lexington Mine, and a number of other mines on that hill. These four tunnels are very well located, and run in such directions as to cut every mineral belt in these hills, and they must eventually become of great utility and necessity for the deeper development of the Little Cottonwood mines.

The other principal tunnels in this district are as follows—Illinois Tunnel, located July 16, 1869, by James Smith, 1500 feet; St. Joseph, 3000 ft.; Silver Belt, 3000 ft.; Geneva, 3000 feet; Vallejo, 2000 ft.; Utah, 3000 ft.; Manhattan, 2000 ft.; Ely, 3000 ft.; Empire, 3000 ft.; Brewer and Lapham, 3000 ft.; Christina, 3000 ft.; Emperor, Lady Esten, Enterprise, Victoria, Wells Fargo, Little Cottonwood, Wallace, Gladiator, Herman, Bay City, Emma Hill, Pacific, Far West, Lone Star State, Lady Emma, Southern Cross, and Jefferson tunnels.

Salt Lake City, Utah, July 24. B. A. M. FROISETH, U.S. Surveys.

THE KANAWHA VALLEY COAL REGION.

SIR,—Quite an excitement prevailed here on the receipt of a prospectus of the Gauley-Kanawha Coal Company (Limited)—a company formed in London about July 5 for the purpose of acquiring and working certain coal property on the Gauley River in this county. This Kanawha Valley is one of the most wonderful coal regions of the world; nowhere else can there be found so large a coal area with such good coal of so many varieties, and so easily mined, but up to the first of last April it was barred out from the markets of the world by the Alleghany Mountains. The completion of the Chesapeake and Ohio River Railway in April last gave everything here a great start, and much benefit was anticipated from the influx of English capital. The Gauley-Kanawha Company's prospectus was the first that reached us. Everybody rushed to read it, but when the astonishing statements it contained were perused a feeling of sadness prevailed in the community, as if news had been received of some great calamity. The people here firmly believe that there is no better opening in the world for the investment of British capital in the mining of coal and manufacture of iron than that offered by the Kanawha Valley coal fields, and they fully realised that to have the first operation launched in London prove a disastrous failure would be to damn this region in that market for years to come. They saw that vital representations in this prospectus were not at all in accordance with the facts of the case, and that the hopes of stockholders were doomed in advance to certain disappointment; they resolved, therefore, if possible to squelch the concern at once, and by forwarding news by cable to do all in their power to protect from loss such persons as had evinced their confidence in this region by subscribing to the stock of this company.

The statement as to the amount of coal in the property is all right, but the fatal error is in saying that this coal can be easily placed in the market; the statement that the Gauley river is navigable for barges at all times of the year is not true; the fact is it is not navigable at all at any season of the year, and cannot be made so without great cost—such a cost as no one company owning 1000, or even 10,000, acres of land could incur.

The right to improve the navigation of the Gauley river has been granted by the Legislature of this State to a company organised for that purpose. To enable the company to succeed a monopoly of the matter has been given to them, which enables them to practically tax (by tolls) not the 1060 acres of the Gauley-Kanawha Company, but every acre of land drained by the whole Gauley river and all its tributaries, yet with all this basis for operations it is doubtful whether the company can raise money sufficient for the work, and in no event does anyone expect it to be done within the next three or four years. If this improvement were made, then this property would be very valuable. The more I read this prospectus the more I am convinced that the vendor in London acted in good faith, really believing that the Gauley river was navigable, otherwise I cannot see what benefit he expected to derive; he takes all his pay in deferred shares, which are not to share in any profits until 20,000*l.* of preferred stock has first received a dividend of 10 per cent. If he knew the real condition of Gauley river he could hardly have expected the stockholders would ever see principal or dividend again.

I enclose you an Editorial on the subject from the *Charleston Daily Courier*, the leading paper published at this place, also the card of Mr. M. F. Maury, jun., who is announced in the prospectus as consulting engineer of the company. Mr. Maury, you will see, repudiates the prospectus. The cable sent to the *Times* was signed by the Mayor of Charleston. Your people may rest assured that the citizens of Kanawha Valley, while eager for the influx of foreign capital, will do all in their power to prevent worthless properties from this region being foisted upon the British public, or even the sale of good properties, at extravagant and ruinous prices. More anon. CARBON.

Charleston, Kanawha County, West Virginia, July 30.

P.S.—Would it not be well to ask the directors to *publish* that report of Mr. M. F. Maury, jun., which they say can be seen at the office. They of course did not mean to *suppress* it.—C.

The *Charleston Daily Courier* very emphatically denounces the Gauley-Kanawha Coal Company, and consider the statements in the prospectus calculated to inflict irreparable injury on the district, as leading English capitalists to anticipate much more than can be realised. The editor says—"The company is formed, so we learn from the prospectus, 'for the purpose of acquiring and working a most valuable freehold property known as the Gauley Mountain Coal Estate, in the Kanawha Valley, West Virginia, now opened out to the markets of the world by the recent completion of the Chesapeake and Ohio Railway.' Its capital is $250,000, divided in 10,000 shares of $25 each. The tract consists of 1060 acres. This, they state, is covered by a magnificent growth of timber, the acre yielding about 15,000 ft., with a sale price of $50 per 1000 ft., leaving a large margin for profit. Now, before we get lost in this dense forest of wonders we would like to call attention to a few of these statements: 1060 acres must amount to $236 per acre, in order to make the capital stock of $250,000, which must give the average Englishman a brilliant idea of what coal lands are sold for here. Then it is well known to anyone who has travelled the Gauley road that the timber has been cut off this 'Eden' very near the river. The lumbermen of this country are also aware that a good acre yields about 6000 ft. instead of 15,000 ft., and that, standing, it only brings about 50 to 75 c. per 1000 ft., and that boards, after the deduction for cost of cutting, &c., are bought for about $15.

"But we are only just approaching the marvels of this wonderful tract, and its still more wonderful description. Without any reference to the Kanawha coal field generally, the promoters of the Gauley-Kanawha Coal Company very ingeniously make use of the reports of the various geologists upon the mineral wealth of the Kanawha Valley, leading the credulous Briton into the fallacious belief that his property has been specially reported upon by some F.R.G.S. or other magnate. To illustrate, we will give one example, and they abound upon every page of the numerous documents which we have before us in regard to this company. Having mentioned the Gauley Mountain coal estate, its richness in coal, its magnificent timber, its accessibility and other of its advantages, the following paragraph appears, without any reference to the Kanawha Valley being made.

"'Prof. Ansted, of the Geological Society, in a report upon this coal field, has stated 'that there are 14 seams of marketable coal above water level, of the aggregate thickness of 63 ft., without faults or slips of any kind.'" This naturally leads a person unacquainted with the country or the report to suppose that this language applies to the Gauley Estate, when the truth is, that Prof. Ansted's report was made upon the coal properties of Paint and Armstrong creeks, upon the opposite side of the Kanawha river from Gauley. * * * *

And so on, all through the prospectus. Where money is to be paid out, vast under-estimates are made. Exaggeration and misrepresentation abound in these statements, and we learn that more applications for shares have been made than the company have to dispose of. It does not take an F.R.M.S. to see the damage that this company is going to do to the Kanawha Valley. We trust that English people may learn that we repudiate these concerns."

THE GAULEY KANAWHA COAL COMPANY.

TO THE EDITOR OF THE DAILY COURIER.

SIR,—In your issue of to-day is an Editorial most adversely criticising the prospectus of an English corporation entitled the Gauley-Kanawha Coal Company. As my name appears in that prospectus as the company's consulting engineer, I feel that I am held liable in no small degree for the statements therein made. Will you allow me, through your columns, to say that I have had nothing whatever to do with getting up that paper, nor was I consulted on a single point in it.

Last April one of the owners of this tract wrote me from London that he was about to form a company there to purchase and work it: but a geological examination was first needed, and the English parties were willing that I should make it, so as to save them the expense of sending out an expert from that country. I, therefore, prepared a report, first treating of the Kanawha coal field in general, then showing the location in it of this property, followed by an enumeration of the coal exposures to be seen thereon, treating in general terms of the ways of getting the coal to the Chesapeake and Ohio Railroad, and winding up by touching on the varieties of timber to be found, but making no mention of any profit to be derived therefrom, nor did I give an estimate as to the cost of working and shipping the coal.

On May 24 this report was mailed in Richmond for England, and under date June 13 I was advised that it had been received, "though hardly needed, as another report has been furnished the company, which they used, and file yours in the office. * * * I mail you a prospectus."

When I received it I was much surprised at its contents; for not only were the figures in the estimate too small, but many items of cost were omitted, and numerous erroneous statements appeared. One of the most striking was that Gauley is navigable all the year round. And this has not been corrected in subsequent issues, although I stated in my report, that "from the mouth of Rich Creek to the Kanawha—seven miles—there is an estimated fall of 30 ft. In this distance are seven shoals, to get over which chutes would have to be made by forcing all the water in the river into one narrow channel."

Knowing that these statements would do our mineral interests incalculable harm if parties came here to mine with expectations based thereon, and from the circumstances that the company had made me their consulting engineer, I thought it incumbent upon me (though my opinion had not been asked) to point them out these errors, and as soon as I could prepare an estimate of costs, &c., did so as follows:—"I have before me the prospectus of your company, in which the cost of preparing a mine to ship 300 tons a day is put down at $20,000. I regret exceedingly that I was not consulted on these figures before they were given to the public, as they are erroneous in many points, it being utterly impossible with the sum named to do what you propose. But, now, being your consulting engineer, I deem it a duty, not only to myself but to the company, that you should not be allowed to come into West Virginia with such expectations as are set forth, as in such a case disappointment would certainly be met with." I then pointed out the errors in the prospectus, gave an estimate for working capital, told them it would require skilful management to make the investment a paying one with the present means of getting coal out of the Gaulay, set them right as to the labour question, &c.

None can deplore more deeply than I that the mineral interests of the Virginias should receive such a shock as this must be. As I have before said, I feel that I am in some measure held accountable for it until an explanation is made, and hence

the reason for my appearing in a card. In conclusion, in addition to the facts I have already given you I would add that there is not a statement in my report or letters to the company that I would wish to alter or retract. M. F. Maury.

Charlestown, W., Virginia, July 28.

The *Charleston Daily Courier* further remarks:—"Mr. Maury's card convinces us that we were in no way unjust in our comments upon this company. He was placed upon the prospectus as consulting engineer of the company, but immediately upon receiving a copy of it wrote to the managers showing the errors in the estimate of expenses, and protesting against the reckless misrepresentations of this scheme as both fatal to the success of the undertaking and most damaging to the development of the Kanawha coal field generally. The report which Mr. Maury made in regard to this property has not been used in making up the prospectus; nor have any corrections been made since the receipt of Mr. Maury's report, in which he pointed out the fatal errors into which the shareholders were being beguiled. How many more of the names figuring upon the prospectus remain there without authority we do not know. We have heard that others, since learning the mode of conducting the company, have withdrawn from it. The report of Mr. Maury, from which he quotes in his card, as to the navigation of Gauley River, acquits him of all share in " " " the Gauley-Kanawha Coal Company."

NOVA SCOTIA MINING TITLES.

Sir,—The instigator of the article entitled "Nova Scotia Mines, and Cheap Law," which appeared in the Journal of the 9th inst., ought to have been a little more explicit in his allegations. As a rule, it will be found that forfeitures have only taken place through non-observance of the covenants under which the titles were granted. Unjustifiable escheats have been made by Order in Council, but they were introduced by the same individual who brought to grief the company to which your prompter refers. The Hon. Robert Robertson, when Chief Commissioner of Mines, strenuously opposed forfeiture of leases; and the present incumbent, the Hon. Daniel Macdonald, a very highly-esteemed barrister, is quite as firm an upholder of "vested rights." While those functionaries remain in the provincial cabinet the pettifoggers will be as shy of the Mines Office as of the paternal last, hod, or pie-basket, from the hard but honestly-earned profits of which so many owe whatever they possess of the legal education they abuse.

London, Aug. 13. A. Heatherington.

THE GOLD FIELDS OF NOVA SCOTIA.

Sir,—A reliable informant, writing from Halifax (July 28), reports:—"Montague still holds out well. The returns from the Albion Mine, owned by Lawson Brothers, are as follows:—April: 41 tons 5 cwts. yielded 159 ozs. 15 dwts.—May: 35 tons yielded 138 ozs. 14 dwts.—June: 30 tons 12 cwts. yielded 135 ozs. 4 dwts."

Another correspondent, a practical Cornish miner, dating from Goldenville (Sherbrooke district), July 28, writes:—"The mines in this locality are looking very well. The Wellington Mine gave $1300 profit last month, and I think will pay better this month. The Palmerston Mine has been worked on tribute the last two years, and the men have done well. The Meridian, Cleverdon, and Excelsior Mines are also being worked on tribute, and are opening up very well. If a good company should take hold of these mines, and work them on the Cornish principle, there would be good dividends paid in a short time. It is a wonder gold mining pays at all in this place, looking at the way things are conducted. The Eldorado Mine, at Wine Harbour, is paying good dividends, and the prospects are good.

Aug. 13. Acadiensis.

NOVA SCOTIAN MINES—CHEAP LAW.

Sir,—The remarks in last week's Journal on cheap law in Nova Scotia are not uncalled for, for serious injury has been done to mining interests by English investors being harassed by legal quibbles being needlessly raised. As respects the Mines Office, I am glad to be able to state that the present Commissioner is an excellent officer, and disposed to do his duty and to discourage technical quibbles. Mr. Robertson, a former Commissioner, was also a very painstaking, honest officer. Nearly all the complaints as respects the gold mines of that province have their origin in the decisions of the local officials who have charge of gold districts. Your article cannot fail to do good. H. G. R.

THE EMMA, FLAGSTAFF, AND LAST CHANCE MINES.

Sir,—I have the same opinion of The Emma. All the information I can gather justifies the conviction that the mine will redeem the good name of "The Emma;" and when I weigh what I hear together with what I know of the results of the ore as each lot is assayed, I can come to but one conclusion, and that is only a good mine can produce such ore: as to quantity, that I have every reason to believe will be large. When the mine shall be put in the condition it will be under Mr. Attwood, and until his work is completed, you will not get much information from Mr. Attwood, because he is very discreet and non-committal. So much so, when he gives out his decided open opinion of the mine, you and all others may rely on his endorsement. A party who has been working in the mine informs me, through a friend, that the mine is looking well. Now, if the mine looks well, and they take out good ore, is it not conclusive as to the mine? The ordinary ore from the mine, as per last assays, give 48¼ lead, 94 4-100 ozs. silver = $121·58, while the selected ore goes from 48 to 52 per cent., lead 538 88-100 ozs. silver to 547 04-100 ozs. silver to the ton. So confident am I of what information controls my judgment that were I in London I would venture freely on 3*l.* 5*s.* to 4*l.* per share. Further information I cannot get. There is no admittance to be had unless by special favour, and this can only be had from Mr. Attwood, on the request of some one of the directors. Could such be, I would go and see for myself. That the mine was in bad condition when Mr. Attwood came here there is no doubt, but when the work he has programmed is done I honestly believe the mine will be as good, if not better, than at any time since first discovered. It is policy for Mr. Attwood to guard his information, as he does, if under doubt in the minds of so many of the stockholders he brings the mine out, will it not be as much glory for him as it will prove beneficial to the shareholders? Were I in his (Mr. A.'s) place, I would be as reticent as he is, and do my work under the doubt that exists as to the mine, for in the end you can see who will reap the benefit.

At the Flagstaff Mine they are taking out upwards of 100 tons of ore per day; they will have all three of their furnaces running in a few days, and any surplus ore they may have they will send over to the Last Chance furnaces (2), which will commence smelting about August 1. And should there be any surplus ore from the Flagstaff it will be sold as the lot of 2000 tons were. The Flagstaff has never run but two furnaces, they have made a reputation from two furnaces, and I cannot see why they should not sustain that reputation when they run three.

Of the Last Chance, its success is to be demonstrated if they use the surplus ore from the Flagstaff. I can see no reason why the Last Chance should not be as good as the Flagstaff; both mines have a large, very large, reserve on hand, round lots of both are now being sampled, and when assayed I will advise you. W. G.

Salt Lake City, July 25.

SPECULATING IN FOREIGN MINE SHARES.

Sir,—I would give "Mine Agent" all credit for his motives in warning the public in general, and parsons in particular, from off the pits and precipices of "pure gambling." It is only natural that a 29-pounder in the Emma Mine should have unreasonable fears as to the results of Utah mining. His fears and conjectures are not, however, argument. He may be convinced himself, without being at all convincing. He has, in truth, given *no reasons* for including Flagstaff in the black list, either in respect of its *promotion*, its *management*, or its *geology*. He tells, indeed, a tale as to how some parties tried and failed to get up a company; but if he can tell the same of the Flagstaff, then, I ask, where is the evidence? And if there be no evidence his suspicions are akin to slander. The vendors of the Flagstaff were, I recollect, specially commended for their honourable dealing. As to management, the mine is worked as all mining enterprises ought to be, and in this respect does not differ from the Cornish method of "mining and searching for ore." If it be otherwise, where, I again ask, is the evidence? The reports of Mr. Maxwell have never been discredited. As to the geology, I see no cause for alarm in "Mine Agent" placing Flagstaff "in the same list, geologically," as the Emma. I need not specify instances of the fact that mines of the same geological formation, and neighbours to a wealthy one, sometimes disappoint and sometimes realise the expectations of "adventurers." But I may safely affirm that all the evidence which exploration of the Flagstaff has brought to light tends to establish the probability of uniformity in the law of its mineral deposits. Pockets imply large accumulations of rich deposits, but no reports of anything of the kind have ever come from Flagstaff—nothing of ever varying quantities and qualities of ore. Where, I again ask, is the evidence for pockets. On the other hand, I may say that pockets seem to present an abnormal condition of the lode, depending on the localisation in a higher degree of the chemical or other forces which produced the ore. But the Flagstaff seems to be in a rock where these influences have not been disturbed, and a regular or normal course of development has proceeded. Accordingly the facts are that the ore is the same in quantity but richer in quality at the 600 feet level, that the mine has paid half its capital without being exhausted to 300 ft., and though there may be poetical exaggeration in the opinion that it may last for ever, its geological revelations are all in favour of the probability that it will abundantly pay the *bona fide* investor, and that the shares are worth more than its detractors would suggest. Of course, probabilities are not certainties, and all mining speculation and anything but investments in land or Three per Cents. is gambling according to "Mine Agent's" principles. I would fain administer comfort to him by suggesting on geological grounds that there is much more likelihood of the Emma Mine becoming (though never financially) a Flagstaff than the Flagstaff turning out an Emma. Besides it is a silver mine, and the produce keeps its value. Bona Fide Investor.

Aug. 11.

MORE COAL IN THE NORTH.

Sir,—I have just learned, on the authority of a competent party, that at a pool called Poolowdie, in the River Nairn, about five miles from Inverness, and about the ordinary level with the river, a seam of coal about 6 in. in depth crops out. There, therefore, cannot be the slightest doubt but that there is coal in this locality, though no attempt has ever been made to ascertain its extent or value. The seam is on the lands of Lanarch, the property of Mr. Duncan Forbes. Surely the success that is attending the Duke of Sutherland's operations at Brora should lead to a trial here.

At the same spot there are unquestionable indications of fire-clay of a good quality.

On the adjoining lands of Culloden, the property of Mr. Arthur Forbes, the numerous ferruginous wells, particularly the one called St. Mary's, in the birch wood of Culloden, show beyond doubt that there is ironstone underneath, though its value, of course, cannot even be guessed at until it is properly tested.

But one thing is certain; there is here a fair field and opening for enterprise. It would seem all but certain that the days of bringing coal from Newcastle to Inverness are near an end.

Raining Stairs, Inverness, August 9. Kennedy McNab.

ON THE UTILISATION OF WATER-POWER IN MINES.

Sir,—I have read with great interest the Prize Essays on Mining in your valuable Journal, and am glad to find that the publication of them is giving rise to profitable discussions as regards this most important branch of industry. Noticing that Mr. Goldsworthy rather strongly comments on the neglect of the utilisation of "water-power" at disposal, my object in writing is to show, in justice to mining engineers, that such is by no means generally the case. I having had occasion some years since to knock about a great deal amongst the mines in Devon and Cornwall, was much struck with what I considered to be every "possible means" taken advantage of to to utilise the water at hand. I give an instance of one of the largest mines in Cornwall, then in full swing. It is situated on a very slight incline, thereby not having so many facilities for the above purpose as most mines, and having for its use no water but that taken from underground—frequently the case—which was done by means of two large single-acting pumping-engines. It was discharged into reservoirs, whence it was conveyed, by means of wooden launders, to large water-wheels, which set in motion, not only extensive machinery for sawing timber for the use of the mines, but also a deal of machinery in the fitting-shop, used for repairing the engines, &c., on the mines. Thence again into reservoirs, to be used for dressing the ores on the main dressing-floors, the machinery here being driven by steam. After having done its work here it was conveyed to several water-wheels driving smaller sets of stamps than those on the main floors, and used for dressing the ores stamped by them and keeping in motion several appliances used. It was not even now permitted to flow undisturbed on its way to the ocean, being still further utilised to drive corn-mills, &c., on the property, being conveyed to them in constructed watercourses, which doubtless richly compensated the shareholders for the slight outlay it occasioned. This, I think, should satisfy Mr. Goldsworthy that there was no neglect in this case, which is by no means an exceptional one, but rather the rule, throughout the county; and I can assure him that Cornish mining engineers are ever ready to adopt any means which may conduce to lessen the cost of working the mines under their superintendence.

Your second E-sayist suggests the construction, as in foreign countries, of large storage reservoirs, in which to collect the water on the hills, and utilise the same in the mines beneath. He seems to be unaware of the fact that there are a few instances of such in Devon—one with which I am acquainted, in connection with the Bagtor Mine, on the borders of the Dartmoor. In this case there is sufficient water collected to keep in motion throughout the year a water-wheel 60 ft. in diameter, which was, on my visit there, capable of driving the whole of the machinery required on the mine—pumping and otherwise. I am of opinion that this plan might be extensively adopted with very profitable results, especially in such parts as Cornwall and Devon, where the natural formation of the hills is such as to render comparatively easy the construction of such reservoirs.

Your correspondent, "R.," of Aug. 6, suggests the use of sea-water in mines near the sea. Though I believe it would not at all injuriously affect the dressing of tin and copper ores, still I am of opinion that, should he take into consideration the cost of raising it to an available height, he would find it would prove quite the reverse of an economical plan.

Mr. Goldsworthy is to be commended for opening up a discussion on this important matter, and which I hope to see well carried out.

Fair-Play.

UTILISING WATER POWER.

Sir,—Your correspondent, "Economy," asks how he can best apply his water-power (about 100 horse power) to drive machinery requiring 30 to 40 horse power, at a distance of three miles from his water-supply. The best plan, in my opinion, would be to employ it to compress air, and to convey the air through pipes to where the power is wanted, and there use it to drive an engine of the plainest and simplest construction to turn his machinery. He would require no boiler, no elaborate masonry work, no chimney, no air-pump, condenser, feed-pump, &c., about the engine; and the saving of all these things would go a long way towards the cost of piping, air compressor, and water-wheel. He would require, probably, 3¼ miles of (say) 9-in. piping, a water-wheel of (say) 50-horse power, and an air compresser. The cost of the latter would be about 300*l.* or 400*l.*

It would be necessary to know more of the country over which the power has to be carried in order to arrive at a just comparison as to the relative cost of each system, to ascertain accurately whether the interest on the excess of first cost of the compressed air plant over that of the steam-engine plant would amount to more or less than the cost of fuel; but on a rough estimate, so far as I can form an idea from the data given, the saving would be about 30 to 40 per cent., but might possibly be made much more. If "Economy" could find a use for all his water-power the saving would be much greater in proportion; but 30 or 40-horse power is rather a small amount to have to convey such a long distance.

The compressed air system possesses many advantages over any system of wire-ropes, clip pullies, &c. In the first place, the loss of pressure through leakages, friction, and abstraction of latent heat from the air would be very little, compared with the amount of power absorbed in driving a wire-rope over such a distance, and the cost of maintenance, wear and tear, interest on first cost, and cost of lubricating the guide or friction pullies, would probably far far exceed the cost of fuel for a steam-engine. On the other hand, the cost of maintenance of the piping would be almost *nil*. The piping could be turned in any direction, and could be laid on the surface of the ground, following its undulations, pass underneath roads, and through or along the beds of streams; and when once laid would give no further trouble, except in the way of occasional inspection of the joints, &c., to guard against leakage. By simply connecting branch pipes where required the air might be drawn off to drive machinery at any intermediate points within reasonable command of the main line of piping.

I have had considerable experience in the use of compressed air as a motive-power, and I feel confident that it might be used to great advantage throughout Cornwall, to turn to account the water-power which abounds in the county, in driving the stamps, pumping machinery, &c. I believe, there is water-power enough in the county to drive all the machinery there, if it could only be brought to bear where the power is wanted. Compressed air affords the best means for effecting that object, as it can be conveyed in main pipes for long distances without any serious loss of power, and tapped off where required, like gas or water.

I shall be glad to communicate further with your correspondent.

Burley, near Leeds, Aug. 7. John Sturgeon.

NEW METHODS OF SEARCHING FOR SPRINGS OF WATER.

Sir,—A few months ago you were kind enough to insert in your valuable Journal a letter of mine, in which I gave some details about certain modern methods now most successfully resorted to on the Continent to ascertain the exact situation of hidden springs and water-bearing strata. Since then I have received from all parts of England a number of letters, requesting me to give further particulars, thereby illustrating to me the interest which the public take in the matter.

Now, Sir, the question being one in which I take great interest, and to which I have paid for years considerable attention, you will find it natural that I should be particular anxious to make it as popular as possible, independently of any pecuniary object. Having now some spare time at my disposal, I beg to offer this to the public. Should any holder of land or property insufficiently supplied with water chose to avail himself of my experience for surveying his land in search of sources of water supply, I beg to offer my service gratuitously, requesting only that the results should be made as widely known as possible through the *Mining Journal*.

May I add that the methods to which I refer are now thoroughly tested. In France and Algeria, as can be proved by official documents, thousands of wells and fountains have been successfully dug where previously most inconvenient scarcity of water prevailed.

Norfolk-square, Southsea, Aug. 10. L. Jourdhui.

SLATE QUARRYING IN ANGLESEA.

Sir,—In last week's Journal was a notice of the formation of a company, "to purchase for 10,000*l.* the tack-note securing the lease of a farm in Anglesea" with the view of slate quarrying there. In this notice are two fallacious statements, which, in the interests of the parties about to form the company, I think it well at once to correct. The first is "That the slate rock is a fine-grained argillaceous variety of shale, similar to the Festiniog class (Lord Palmerston's), in which formation the proportion of the cleaved rock to the general mass attains its maximum." Upon this I will remark that the member of the Silurian strata, in which the only valuable Festiniog slate quarries are found—Lord Palmerston amongst them—is a comparatively small deposit, extending from the Arrenig mountains on the east, where it begins, to Moel-wyn on the west, where it dies out. Throughout the whole of this deposit trials for slate have been made, but as yet—and I fear future experience will but confirm the past—only in a very small portion in the middle of it, about three miles long by one in breadth from Rhiwbach to the Cwy-Morthin fault, have they led to any profitable result. Beyond these points, north, south, east, and west, nothing but disappointment has been met with. In Anglesea no rock similar to this formation is found, though there is plenty of cleavable argillaceous shell, which is not true slate, as there is also in the neighbourhood of Festiniog, that has already been the cause of very serious loss to all who have worked it. *Verbum sapientiæ satis est.*

The second misleading statement is at the end of the notice, and refers to the size of the slates made, and the probable profit. In the Festiniog quarries the larger sized slates 18×9 upwards, are found to be profitable; slates below that size are considered to be of little value, and as is the make of those larger sizes in proportion to the smaller, so is the profit of the quarry. Such being the case, from the statement of your correspondent that at "The Llanfiewin slate and slab quarry the slates made range up to 20×10." I fear his confident anticipation that the dividends will be "at the rate of at least 20 per cent. per annum" is the sanguine outburst of a fervid imagination, rather than the well-considered result of a practical knowledge of slate quarrying.

August 13. A Festiniog Slate Quarry Proprietor.

MINING IN NORTH WALES, AND ITS PROSPECTS—No. IV.

Sir,—In further considering the prospects of North Wales for profitable mining I propose to direct attention to the district of which I gave an outline in my last letter, and which may be better known as the Llanrwst district.

If multiplicity of lodes and intersections are the unerring prelude to success in mining when occurring in favourable strata, and under otherwise favourable circumstances, we have all the desired elements of such success, and if the product of the prolonged but hitherto superficial scratchings which have been perpetrated are any criterion of the future, and it certainly is, we have here a district which can scarcely be equalled in its beautifully striking mineralogical outline and evident productive capacity, but one to which greater injustice has been done by the way it has been worked in the past has never come under my observation in Great Britain. Almost every step I take an object which presents itself to the view here reminds me of the class of mining—so-called—which I was compelled to witness outside my own works for a series of years in the western states of America. If there had been a lack of capital there certainly has been also an equal lack of skill in its application. It is deplorable to contemplate the great waste of time and money which is so generally evidenced in this district by the superficial workings, shafts, and levels which for the most part appear to have been blindly operated, expensive efforts addressed to objects vaguely guessed at, and in the greater number of cases misdirected. Sufficient useless work has been done at the mines now under my direction which, if properly directed, would have been sufficient to lay open the mine fully, and provide those necessary adjuncts which are indispensable to permanent, profitable, and economical mining, including the necessary mechanical arrangements, and attained results which would have been eminently remunerative and creditable to mining. But instead of that the knocked mines and mines in abeyance are triumphantly appealed to by prejudiced minds as self-evidencing proofs of their incapacity to yield remuneratively, whilst the incontrovertible fact is that the incapacity was only in those assuming to direct the operations. And this is not a solitary instance, but one which is truly characteristic of the class of mining which has until recently from the Roman period been prosecuted in this neighbourhood. It is pre-eminently the digging system—two or three men working a whole mine from the adit upwards as a sort of tributers, engrossed with the present and caring nothing for the future. Is it to be wondered at, then, that districts should be of no reputation when subjected to such an ordeal as this has been and, to a large extent, still is. One-fiftieth part of the prospects which are here would suffice almost at any time to start a mine with high enthusiasm in Cornwall. Whence, then, this fascination in favour of one district to the utter neglect of other equally sound and meritorious districts? The most brilliant prospects previous to a mine being opened can be construed into nothing better than a moral certainty of its success. The prospects of mine after mine here will bear such a construction without the least straining or colouring of truth. The lodes throughout the district are numerous and well-defined, cropping up to the surface, and producing lead in unusually large quantities up to within a very few feet of their outcrop. At Trefriw granite occurs, and about three miles southerly from Trefriw the Llanrwrst Lead Mines are situate. The country rock at these mines is grauwacke, and evidently from the fossil plants it contains of the Devonian period, and unquestionably of a highly congenial character for lead. It is surprising that so much blindness should exist as is manifest here in respect of mines whose cardinal features are so well and strikingly pronounced. They may be read in the light of experience as easily and as unmistakeably as the large capital letters of the alphabet may be read by the village pedagogue. It is a pleasant thing enough to read about such mines, and an equally gratifying duty to redeem them from the temporary oblivion into which they have been cast. The prospects are so so-

suring that a great deal may be said in their favour, and yet an immense margin remains for all conceivable and inconceivable contingencies.

It matters much under what conditions shallow bunches of ore occur. Some of them are decidedly superficial and necessarily shrudged. Fissures may be formed in disrupted masses of congenial rocks, both before and after their projection, which are themselves limited in extent, and fissures contained therein must in all cases be correspondingly confined unless the disrupted masses should find a congenial element in the superincumbent rent rocks; but there are other cases where ores superficially occurring are the legitimate outcrop of immense bodies of ores which are found to extend—subject to variations from numerous causes—to the greatest depths to which mining has yet been prosecuted, and up to the present without betraying any evidences of decay. It would be well generally before pronouncing mining districts ephemeral, sensational, or permanent in their capacity for yielding metallic minerals, to study patiently those features which alone give evidence necessary to guide one in his conclusions regarding such matters. I derive my conclusions as to future results of the prospects here as I have learnt by experience to do elsewhere; and until it can be shown, or I can discover some special or peculiar circumstance in the physical condition of the rocks, cross-courses and lodes, which are calculated in the nature of things to militate against its productiveness, I must maintain the good opinion I have formed of the prospects and value of Welsh mines generally, and of this district in particular, and contend that abuse by bad and incompetent management has alone been the cause of its present disreputable and neglected condition.

Llanrust, Aug. 13. ROBERT KNAPP.

RHOSWYDDOL MINE, AND MR. GREEN'S DRESSING MACHINERY.

SIR,—In the Journal of Aug. 2 Mr. Green's letter, in reply to "Pedestrian," contains indirect and unfavourable reflections upon Mr. Edward Davies, late manager of the Rhoswyddol Mines. If Mr. Davies had been in England it would have been quite unnecessary for me to take any notice of Mr. Green's insinuations, for Mr. Davies is quite capable of defending himself against any charges that Mr. Green, or anyone else, may bring against him. Mr. Green makes it appear that he and his friends were duped in the purchase of Rhoswyddol. Now, Mr. Green knew Rhoswyddol for years previous to his friends taking it up, and if we are not mistaken he was repeatedly underground before this purchase was completed. What did he go underground for if not to advise his friends as to the value of the property? One thing is quite certain—that Mr. Green from what he professed to have seen underground estimated the daily returns of ore stuff, and that he undertook to provide machinery to deal with it at a cost that would leave a handsome margin as profit. It is equally certain that Mr. Edward Davies from the commencement declined any responsibility as to the efficiency of the machinery that Mr. Green was introducing. But when this machinery, which by the time it was completed had absorbed nearly the whole of the available capital of the company, was found perfectly inadequate for the purposes it was intended for, and when one part after another broke down until at last the whole arrangement had become a perfect wreck, someone must be made a scapegoat of to pacify the discontented shareholders, Mr. Edward Davies was marked out as the victim. That Mr. Davies was not in any way responsible for this failure has been sufficiently proved by future events at other mines where Mr. Green's new system has been adopted. We hear everywhere of the same failures, and of the same endless repairs and expensive alterations. We refer, for instance, to Pencefn, Great Darren, Bodcoll, Pen'allt, Esgair Mwyn, &c.

Mr. Green professes to be in possession of information from the former company, which makes his little success, small as it is, look very bright when compared with what was done under the management of Mr. Davies for the former company. He forgets to say when he got this important information; before or after his friends becoming purchasers. In any case Mr. Green, if there be any foundation to his statement at all, will, upon his own showing, appear as a most unsafe and thoroughly careless mining broker. He is not generous enough to admit that the mine at the time immediately preceding the formation of the present company was paying its way, and that with very imperfect machinery. He might, however, for his own sake remember that he made use of this argument when inducing his friends to join in the adventure. The fact that Mr. Green at once stands in the position of a mining broker, mining engineer, merchant of mining materials, and manufacturer of mining machinery, is sufficient, perhaps, to account for the confusion of his ideas, but if he is fortunate enough to meet with mining proprietors generous enough to pay him and his Glasgow friends large royalties for the use of machinery that has been in public use in England at least 10 years previous to the date of the earliest of his patents, he is going a little too far when he tries to saddle innocent mining agents with his endless mechanical blunders, and it is quite time that a public protest should be made against it.

We have it on very good authority that there is no material change in the value of the ore ground at Rhoswyddol since Mr. Davies left; and if Mr Green, now after a large outlay in the reconstruction and remodelling of his dressing-floors, is in a position to make "nice little profits," we must repeat what Mr. Davies said over and over again—that these profits ought to have been made long ago but for Mr. Green's machinery. By-the-bye, Mr. Green made a great noise about a rock-boring machine of his some years ago; what has become of it? MALDWYN.

IMPROVEMENTS IN LEAD DRESSING—RHOSWYDDOL.

SIR,—After wading through "Pedestrian's" communication, published in last week's Journal, I am as much displeased at his effrontery as I am astounded at the ignorance he displays on a subject on which he is ambitious of being considered an authority. Were it not that his misrepresentations may mislead the unguarded and credulous, I should certainly smile at his involuntary exhibition of ill-humour without deigning to further notice his letters. It is always difficult to keep the strands of a discussion together when one of the parties continually loses sight of the point at issue, and equally difficult to follow him in his aerial flights, or reduce to a method the unshapely chaos with which he surrounds himself. The original question was substantially this—Did Rhoswyddol, with the old dressing appliances, when the lodes were extraordinarily rich, yield the shareholders reasonable dividends; and does it now, with the present automatic system, and lodes of less than one-fourth their former valve, remunerate the adventurer? These are, or should be, the vital points of the controversy gratuitously provoked by "Pedestrian," and which I have in these columns, in my last letter, sufficiently explained to create conviction in the minds of any person accepting it as truth, which I can assure them it is. Notwithstanding that much of "Pedestrian's" last is irrelevant to the question at issue, lest it may be thought that I shrink from the anecdos thrown out, I make the following brief comments. First,—As to his having had permission to visit the mine. I have the resident agent's authority for avowing that he did not give him leave. I have likewise the assurance that he received no permission from the manager or his assistant, nor that of the proprietor. I, therefore, still aver that if the visit was made at all it was nocturnal or surreptitious. Secondly,—Mr. Green had no intention of affirming that a lode yielding 4 tons to the fathom was not a rich one. What he unmistakeably intended to convey was that the mine was not rich in the only true sense in which a mine can be so considered—that of returning (not immense quantities of minerals burdened with costs of transit and treatment in excess of its selling value, but) fair profits to the enterprising proprietors on their truly liberal outlay. A mine that is esteemed rich in mineral formations, and worse than barren of dividends, was never an El Dorado to even the most gullible of mankind, nor perhaps to "Pedestrian;" but he insinuates "that 8 tons per fathom does not seem much to the eye of an engineer." Why not, as well as to that of "Pedestrian." By the way, it would appear that the visual faculties of the latter are anything but reliable (probably the lens becomes reversed or inverted at times, as envy or prejudice supervenes), as we shall presently see. But happening to know something of that able engineer, whose advice, even on mining matters, is such as has been repeatedly proved of no mean order, is frequently sought after by mining gentlemen as proficient in the art as the great "Pedestrian" himself, and as frequently followed with success. I can inform your correspondent that I have never seen him disposed to "hang his harp on the willow" on seeing a lode worth only 12 cwts. per fathom. But this "skit" at the engineer is unworthy even the "meanest of mankind." Is the fact of one being an engineer incompatible with his being a miner—or, is a miner without engineering skill worth the space he occupies. Mr. Green has during the past few years undeniably made himself conspicuous in mining matters, but in such a way as every miner would be ambitious of doing, by conferring a lasting boon on mining generally, as the results attending his skill and perseverance amply testify. Numerous testimonials to the efficiency of the mechanical improvements he has introduced into mining have been received from well-known proprietors of extensive mining concerns who have adopted his system, and continue to express their most unqualified approval of its superior merits. But to say more on this head would be superfluous. The engineer has undoubtedly made for himself a name and reputation that will be remembered when "Pedestrian's" will be——well, let him turn over a new leaf, and do something worthy of being remembered by posterity. Thirdly,—Notwithstanding the fact that Bwlchcoch lode once produced 8 tons per fathom (which, not being challenged by "Pedestrian," we take it for granted he admits), it does not necessarily follow that it would at that period realise the sum of 120*l*. On the contrary, the value of lead ore has since then considerably advanced, and at the present time 15*l*. would be considered a good price for the Rhoswyddol ore; consequently, the fabulous profit of 100*l*. per fathom exists only—to borrow a phrase from "Cymro"—in "Pedestrian's" unpoetic imagination. (I do not quite approve of the applicability of this compliment though, for it is evident that "Pedestrian" largely avails himself of poetical licence): 20*l*., too, leaves a fair margin for contingent expenses (?) on the spending and treatment of a fathom of ground. This would represent a monthly working cost of something like 520*l*. for what we are now doing. So much for "Pedestrian's" mining. The *credit* balance is surely in favour of the "engineer" who has enabled us to do the same amount of work at a third of the cost. But may we not somewhat qualify his assertion, that he may not complain of unfair advantage being taken of him, by taking the then value of the lodes at 4 tons per fathom, that (say) 50*l*. profit could be cleared on every fathom. But it is already sufficiently well known that no profits were actually made, and that the amount which, according to "Pedestrian's" own showing, should have been declared in dividends was absorbed. How, where? "Aye, there's the rub." "There were no elaborate patents there then we know, but withal they were able to dress as much as 80 tons per month," and make no profits, "whereas with the patents our maximum figure is only less" than half that number of tons, and we do remanerate the adventurers. The "consummation devoutly wished" by the former proprietors is now realised, and we should fancy the "rub" is sufficiently exposed to be perceptible even to "Pedestrian's" lutulent vision. But he, moreover, intimates that the capacity of the patent is not equal to that of the old machinery, by affirming that "to accomplish half the quantity dressed" by the latter "the patents had to work night and day." This argues what I have before laid to "Pedestrian's" charge, total ignorance of facts, for the patents never had orestuff containing one-eighth the percentage of lead raised and dressed previous to their erection, while their capacity is equal not only to units and tens, but hundreds of tons monthly, where they have the ore to dress, as the Colberry and other mines in the North of England abundantly prove. The system is now in course of erection at the Bratsberg Copper Mine, Norway, where a similar quantity of copper will have to be got through monthly. One word more on this head, and I think "Pedestrian" should be satisfied that they are not so expensive as he has imagined, for they have paid five times over for their erection at Rhoswyddol, and that money has been spent on the mine. "Pedestrian" should not include the 35-ft. water-wheel, 38-in. crusher, steam-engines, and stamps under the head of patent machines. The stamps might certainly be well replaced by Girwood's Reciprocating Crusher (not in existence when they were erected), which answers far better for lead mines, and probably would for tin mines too. I presume this sufficient data to enable "Pedestrian" to "compare the real worth of the patents with the old fashioned machinery." Fourthly,—I find him "sitting in the regions of mental darkness," hopelessly struggling with the stupendous question, "Why is it that the lead ore sold from the neighbouring mines which are on the same lodes realise an average value of 20s. to 30s. a ton more than the Rhoswyddol ore?" We have yet to learn that it does. But, granting that a fact, does it necessarily follow the difference is made in the dressing? I have no doubt the ore is made clean at each and all of the mines, else it would not be accepted in the market, and no dresser would have it said of him that he failed to obtain a clean product, whether using "lue" or any other means. Then neither process could convert the lead into silver, or the silver into gold; therefore, the difference in price must be accounted for by the difference in the analytical constituents of the ore: for, as I apprehend it, the relative prices of lead ores are governed by the percentage of silver they contain. Therefore, the *reason* of the difference is clear. Does "Pedestrian" really believe that the same lodes must necessarily produce not only ores of the same kind, but ores of a like quality in every locality or geological formation they traverse? If not, he should not blame the dressing for depreciation of price, nor us for not putting a "philosopher's stone" into every jigger. I dismiss this portion of "Pedestrian's" letter with only one further observation, which is that he is "welcome as flowers in May" to anything he can fish out of the river, and to facilitate his operations there I will cheerfully hand over to him his beloved "cerwyn, lue, and gogerfach." Lastly,—"Pedestrian" asks, "Is it a fact that the only stope they have in the mine of any value is several yards before the end of the level?" This query is so ridiculously put as almost to baffle reply, as, if the "stope was several yards in advance of the level," how did he distinguish where the level terminated and the stope began?" But I can just pick out his meaning, and answer him thus—that the stope is taken from a trial drift put some few fathoms above the permanent level, to ascertain the nature of what was then apparently a mere pocket of ore. This was done by the former agent when the mine was looking poor generally. The stope is not "several yards nor at all in advance of the level proper, which shows your correspondent again at fault. Nevertheless, we do intend working this section by a "series of drifts," for we have perpendicular backs of over 45 fms. covering this level, and much more on the underlie of the lode, while we gain backs in further driving into the heart of the mountain. Possibly "Pedestrian" was not aware that the only reason for not driving this level the past month or two was its being ill ventilated, which we shall entirely obviate, as the winze now sinking under the shallow level is holed to the rise. His remarks about this portion of the mine convinces me that he either did not visit the mine, or, as I before intimated, his visual faculties were rather lax in serving him. I am further confirmed on this point by his affirming that we have only one stope in the mine of any value, which sufficiently proves his ignorance of all that pertains to it. In conclusion, Sir, while I regret having so far trespassed on your valuable space, I advise "Pedestrian" to beware for the future that he does not again overshoot his mark and betray his animus. S. Y. DUNN.

THE TIN TRADE, AND ITS PROSPECTS.

SIR,—The position and prospects of the Tin Trade and of Tin Mining are engaging very general attention, and as my experience as a worker and owner of tin mines is considerable I will trouble you with a few observations.

There is a very general impression in Cornwall that the market is likely to be overwhelmed by foreign supplies. This feeling has been intensified by some failures in Cornish undertakings, which were not caused either by defects in the operations or deficient remuneration in the production, but by outside speculators. These persons frequently "bear" the shares, a fall follows, there is sure in such instances to be a panic or a *quasi* panic. Shares are sold at any price and often relinquished without a price, the number of shareholders becomes restricted, while the burdens are increased, and at last the liabilities become so heavy that the enterprise is closed. There can be no doubt that instances of this kind have been too numerous in Cornwall not to injure Cornish mining.

As to the probability of the market being glutted we do not believe it; so far, the supply of foreign tin has necessitated an increased consumption of English tin, and this is likely to continue to be the case from the peculiar quality of the English produce as compared with that of other countries, so far as is known.

There is now Australian tin in this market, but the quantity is small; and it is from the Great Eastern Archipelago, through the Dutch colonists, miners, and merchants that foreign tin is at present almost exclusively attainable. The supply from this source has been gradually, quietly, but sensibly lessening, and the expense of working the Straits Mines progressively, although not rapidly, increases. There is little of surface product left, and, of course, the deeper the deposits the heavier the expense. The Dutch Traders feel and admit the force of the representations we thus make. Of course, the Cornish tin mines are deeper than any in the Archipelago, but they are made and accessible, and have a great market—one might say at the mine's mouth. The application of deep mine working in the Straits would render the workers utterly unable to compete with English tin in Europe. Of course, there may be other tin deposits found in the islands which stud the ocean in such numbers from Singapore to Australia, but ages will probably elapse before the like occurs anywhere out of the Dutch settlements. Sumatra and Java have been explored to the uttermost, and although their resources are great, as Sir Stamford Raffles pointed out long ago, when he urged their occupation by the British Government, their tin production will never startle the Cornish miners.

In the three Presidencies proper of India there is no tin. In both slopes of the Himalayas there probably is, but it may sleep there for many a year before pick and shovel awake it.

The Indo Chinese Peninsula, in all probability, contains none except near the junction of the Chinese, Burmese, and British territories, but it has yet to be found, and is a long way off. In that part of the great Peninsula called British Burmah, comprising Pegu, Martiban, Tenesseim, &c., there is certainly none.

In Australia there are several deposits; there is one in New South Wales, and another somewhere in South Australia, the name of the localisation of which has escaped my memory.

Queensland reports large deposits, and so does Tasmania. It is the opinion of warm friends of the colonies, as much as of the Mother Country, that the tin deposits of Australia anywhere cannot be worked and exported to this country except when tin is very scarce and dear here. When such is the case, of course, our colonial tin will be welcome and beneficial, but so far it is pretty well agreed on all hands that there need be no apprehension of a damaging competition.

Our most formidable competitor for the future—perhaps the only one—will be Mexico. That country is probably the richest mineral area in the world, unless it be California, and the fact of its being staniferous has been long known. During the visit of the great traveller and philosopher, Humboldt, he made the mineral wealth of Mexico a subject of investigation, and amongst the varied metalliferous treasures which he explored he enumerates tin as being abundant in various districts, and as obtained by the natives in the form of stream tin, as it is designated in Cornwall. The vast range of mountains, which forms the back bones of the American continent, is richer in metals than any other mountain range in the world. This ridge stretches away from British North America to nearly the extreme south, bearing three different designations in different regions through which it rises. In English-speaking America it is called the Rocky Mountains, in Mexico the Cordilleras, and in South America the Andes.

That the Cordilleras are rich in tin was the substance of Humboldt's testimony, and from its ridges and sides, through ravines and streams, the tin is borne away, sinking into the alluvial soil, and showing itself in the dry channels in the rainless seasons. So much has been known since the days of the learned explorer, and the great and important fact was neglected. Mexico was the great breeder of revolutions—as to the north Virginia was the great breeder of niggers—and, therefore, shut out from European enterprise, and the application of European capital and talent. Recently, however, attention has been called to the important facts, and when Capt. Grose, some little time ago, was in Mexico he pushed enquiry into them, and satisfied himself that some of the vastest deposits of tin in the world are in Mexico, in the regions mainly pointed out by Humboldt, and in other localities.

About 250 miles from the city of Mexico stream tin may be obtained in any quantities, from the size of a pea to a football, and, according to Capt. Grose, it can be landed in England for 40*l*. per ton. Large quantities are deposited in the deeper gullies, and through the soil in the beds of streams, to the extent of 6 ft. deep, so long have those deposits been forming. This great discovery, instead of checking the market will stimulate demand, for the requirement for tin, like that of gold, silver, and diamonds, will never cease. It is now an article of nearly universal use, but the world is not half supplied.

A preliminary company has been formed. Gentlemen of scientific skill and practical experience have been selected to investigate and procure the necessary prerogatives and concessions. Persons of commercial influence, and acquainted with Mexico, do not hesitate to say that this undertaking will pay cent. per cent.

Gresham House, London, Aug. 13. THOS. SPARGO.

TIN MINES, SMELTERS—CO-OPERATIVE SELF-SUPPORT.

SIR,—The desirability for co-operation amongst miners to conserve and protect their own interests has long been acknowledged as desirable, but has now become an absolute necessity if the tin mines of Cornwall are to exist as a remunerative property, and foreign capital drawn into the county to work them. Providence, St. Ives Consols, Great Vor, Margaret, Botallack, Ped-an-drea, Boscaswell Downs, Spearne Moor, St. Just Amalamgated, Trumpet Consols, and others, must cease to work, or better prices for tin, and cheaper supplies of fuel material and more efficient machinery must be obtained and utilised. The day is passed when the "vested interests of Cornwall" are to rule the "roost," to prescribe the limits, and to dictate the *modus operanda* of mining operations. Machinery must be purchased for efficiency and economy, irrespective of weight of metal and profits of merchants; managers must be appointed who are beyond the influence, far less control, of merchants, smelters, and landlords. The vested interests of all executives is dividends to shareholders; the profits to merchants and lords must necessarily accrue, but in the conduct of mining they are of no importance to the agents. The outlay is incurred by the proprietary, and their advantage should alone be considered. There is a project afloat—and soon likely to assume practical form, and especially so if supported by those who are interested as shareholders in Cornish mining—to constitute a *co-operative company* of 2,000,000*l*. capital to purchase *tin* and *tin ores*, smelt the latter, and advance on that metal; to act as bankers, and thus *destroy that monopoly* so long existing between the smelters and bankers established west of Bodmin, and extending even to Cape Cornwall; to work coal mines, and to introduce fuel at cost prices; machinery from the North of England of lighter weight, less cost, and more efficient power than that in ordinary use; materials and supplies at the lowest prices, and free from the pressure of landlords, and in open competition with the resident merchants, together with other and various objects that will in due course be announced through your valuable columns. In the interim the *promoters* will duly appreciate any and all communications from "practicals" and those interested in mining, addressed to me, as secretary *pro tem.*,—for, in our judgment the cordial reception of such a company will confer incalculable advantages on *bona fide* mining enterprise, and prove *de facto* the salvation of the county. Already Banca tin has fallen 26*l*. 14s. a ton since July 1872, and Dolcoath 19*l*. a ton (ore) during the same period. Should the capricious confederation of smelters drop the price 10*l*. to 12*l*. more, not a single mine in Cornwall will meet the costs of working. *Reformation wanting indeed!*

The total imports of coal into the port of London by sea for the seven months ending 31st July amounted to 1,531,802 tons, and as compared with the same period for the preceding year it exhibits an increase of 14,998 tons. Railways and canals introduced into the London districts 2,898,048 tons, as against 2,885,577 tons for the corresponding period of 1872, showing an advance of 12,471 tons. Total increase in 1873 to July 31, 27,469 tons. Of this large quantity 1,897,048 tons were absorbed within the radius of the London district, and 1,000,947 tons exported coastwise, inland, and to foreign parts. Thus, for the seven months our exports exceed that of 1872 by 86,274 tons, while allowing for the increased imports (27,469 tons) the consumption in the Metropolitan district declined to the extent of 58,805 tons (Jan. 1 to July 31).

It is evident from these statistics that we are not likely to see coal again at former or normal prices of three to ten years since; and it is necessary in working the mines in Cornwall to rest our calculations of costs for fuel at ruling quotations for coal. Hence it is absurd to attempt the drainage and opening of our deep and abandoned tin mines unless we can get an increased price for the product. These remarks apply to Great Wheal Busy, Penstruthal Consols, Wheal Rose, North Roskear, and numerous other concerns that doubtless will yield large quantities of *tin*, and pay well too, if *tin* sold at 175*l*. to 200*l*. a ton, yet at existing depressed prices very few of even our choisest mines can yield any profits to the miners. The exports of *tin* from Holland for five months—Jan. 1 to May 31, 1871—were 2678 tons; for 1872, 1903 tons; and for 1873 they rose to 3196 tons, an advance in the two years of 418 tons, just 40 per cent. only of the product of *Dolcoath Mine* for one year. Still, in the face of increasing consumption and rapidly advanced and advancing costs of production, the price of Banca has declined 26*l*. 14. a ton in one year.

Dolcoath costs for the three month just audited were 15,423*l*., or (say) 61,692*l*. annually. The revenue—257 tons of black tin—realised 19,613*l*., or (say) 71*l*. 6s. a ton, a fall of 19*l*. a ton in one year, equal to 3838*l*. quarterly, or 15,532*l*. annually! The dividend for the last quarter was 15s. a share, equal to 12,984*l*. a year, or 6½ per cent. on the market price of shares. For the year 1872 the dividends were 45,000*l*., and the mine was not so productive as it is at present, the bottom level being worth 150*l*. per fathom (314 under adit, or 354 from surface)! The sales last quarter exceeded the previous one by 26 tons, yet the money value was 17*l*. less, and costs of production and dressing increased 900*l*.! Hence the adventurers have not only lost 26 tons of tin but 17*l*. in money and 900*l*. in costs, raising the total to 2770*l*. in one quarter; arising *solely from the decline in market value* of tin, and the increased costs of augmenting the sales of ores from 231 to 257 tons. This great and important company, expending over 60,000*l*. annually, has only a cash balance carried forward of 151*l*., so that *de facto* the ores must be sold from hand to mouth to meet current expenses! Hence the executive is wholly at the mercy of smelters. *The commercial value of tin is, and will not be less than*, 180*l*. *to* 200*l*. *per ton after the establishment of the proposed company and its arrangements with the Dutch Government.*

The London and Westminster Bank yearly estimates their stock of bullion and securities in hand, and declare a dividend according to their gains based on their estimates; then why cannot Dolcoath "stock" their tin (as the said co-operative company will enable all sound tin mines to do), and estimate its value, and declare a dividend on the ascertained profits, just as the London and Westminster Bank directors do? Simply for this reason, they possess no capital: 171*l*.

is all that the company possesses. The sales are imperative, and the *executive are in the hands of smelters!* A trading concern, expending upwards of 60,000*l.* annually in labour and maintainance of plant, would be thought little of, with a revenue only of about 76,000*l.*, and especially if taxed out of it to the extent of 4000*l.* for royalty, as Dolcoath is. Another fall of 12*l.* a ton will extinguish the dividends, and leave the landlord the only gainer.

The Tankerville Lead Mine is the very reverse of Dolcoath in respect to costs of working. The produce was 1812 tons of ore, that realised 27,300*l.* at an average advance in price of 2*l.* 8s. 5d. over the previous year—why should lead advance and tin decline? Simply from the close and *combined action of the Cornish tin smelters.* The profits of Tankerville compare still more favourably—or rather there is no comparison whatever—with Dolcoath. The dividends were 14,400*l.*, or rather over 52½ per cent. of revenue, inclusive of royalty or dues.

TREDINNICK AND CO.,
32, *Fleet-street, Aug.* 12. ——— Dealers in Stocks and Shares.

GREAT LAXEY MINES—MANAGEMENT.

SIR,—Your correspondent, heading his article in last week's Journal "Laxey Mines," refers to certain annoyances from "employees," &c., and amongst other matters the strike of last year; this cannot be attributed to me, though I had something to do in restoring confidence and good will amongst the men, which I am happy to find continues up to the present moment. "Fair play and no favour" has been our motto, and that has brought peace to the men, and prosperity to the company, which I dare say will not be denied, as figures and facts will tell.

The resolution passed by the directors would not have been referred to by me but for the prominence given to it by your correspondent, and in my opinion uncalled for—that is, the high wages earned by the miners. I believe the prices throughout the mine are fair and honest between all parties concerned, and, taking a deep mine into account, our prices will bear comparison with similar hard ground mines. I know of no scale, or guage, that will average men's wages to any fixed sum. What is termed amongst miners as owners' account, making up small pittances to men, called "average," is enough to spoil all men and all mines wherever introduced; but by giving the men a fair price in sight, and as much as they can do at least for one month, is well known to all practical men to be the only legitimate way to carry out operations, especially in such a mine as this. This, then, is the system carried out here; and I can assure your correspondent that a less vigorous system will not do for Laxey. Low wages—that is, what is called shift work—means no dividends. A fair price means prosperity to all. Such is the difference between nominal prices and real bargains. As for "insubordination, or not under any control," that is entirely new to me, and is totally untrue. J. POLGLASE.

Laxey Glen, Isle of Man, August 13.

WHO WORKED THE GREAT LODE, TREGARDOCK MINE, CORNWALL?

SIR,—May I ask what has been done in this mine for the last 100 years to prove that great and extraordinary large and fine gossan lode, spotted with lead throughout at surface? It is supposed to be a paying ore-bearing lode, and I contend it is. It has been open to view for 200 fms. in length for hundreds of years past. I have known it for 60 years, but it is always taken up by parties who do not (for reasons known only to themselves) work it in a miner-like manner; one party drives on one branch, the next on another; others get up in the cliff, and make what may be called pigeon-holes, but I expect they are only used by seals or adders for hiding places. Some pretended to drive cross-cuts for years, to cut the before-mentioned great south lode at sea level, but it appears as though they were unfortunate, as the promoters or adventurers would never provide a dial, or the party in office could or would not use it. How unfortunate that such a promising lode as this to be seen open should have been for over half a century in the hands of such narrow-minded men, who have spent over 30,000*l.* on it, though neither adventurers nor agents ever appear to have known what direction they were driving in. They commenced to drive, as they supposed, to cut the great south lode, but after years of working they holed out to the North Sea. I do not know what countrymen they chose for their agents, but it is supposed they were not Cornishmen that so often lose their reckoning. Can they excuse themselves, as the captains of merchant and emigrant ships have done of late, and back out of it by saying the tidal current drove them after it into the sea? Be that as it may, the 30,000*l.* is spent and gone. This mode of working does appear strange, as I would undertake to cross-cut to this great and promising lode at sea level, which is from 30 to 40 fathoms deep, for 50*l.* The working of this mine is certainly an experiment which shows how mining money is often spent. I contend it is this great and promising lode that should be prosecuted, for, if that prove to be worthless, what can they expect to find to pay them in its offshoots or branches.

Wadebridge, Aug. 13. ——— N. ENNOR.

EAST BASSET.

SIR,—I feel considerable pleasure at the very quick success which has followed on the change of managers in East Basset, and congratulate the company upon it. It is tolerably clear that it was intended that the mine should be abandoned, and, doubtless, but for Capt. R. Pryor's foresight it would have been so. Fortunately for the company, Capt. R. Pryor, who held, and still holds, a large interest in the mine, knew the state of it, and resolved that it should not stop if he could possibly prevent it. He, therefore, determined to have a meeting of the company held in London, that the large adventurers there might have an opportunity of expressing their will. At this meeting Capt. Pryor was appointed the manager; and what has followed? A mine that Capt. L. (as I understand) said was not worth "a rap" has become a great success. Tin of very high produce (the best I ever saw) has been brought to surface; and a parcel of 7 tons of it, the produce of four weeks' working, is now nearly ready for the smelting-house. A rich copper lode has also been cut (not known before); so that, altogether, the adventurers have great reason to be glad. I have no time to enlarge now, but will send more particulars in a few days. OBSERVER.

Crowan, Aug. 13.

NEW ROSEWARNE MINE, AND ITS MANAGEMENT.

SIR,—In the year 1871 this very promising mine was put to work by a London company. When only in fork to the 46 they discovered a lode worth from 200*l.* to 300*l.* per fathom for tin, and the mine has only paid cost one quarter. The shareholders and the public generally are led to ask, How is it? The problem is not difficult to solve, but one which few care to interfere with in a public paper; but suggestions are of no avail, therefore I take the only alternative, being interested. In the first place, neither of the agents would seem to know much about tin dressing. The first three months the new stamps worked the sample book showed a waste or loss of 15 tons of tin. What can the lord of the land be thinking about to see such a destruction of his property, he being connected with mining for over 20 years? There has been an enormous outlay in needless things, whereas necessary articles are altogether omitted. A tin dresser should have the interest of the adventurers at heart, and wish to give them a percentage for their money by economy and care in dressing, then how is it that no less than seven or eight tin dressers have left the mine in about 12 or 14 months? One of the dressers told the writer that when he first went to the mine he wanted to repair the present defective machinery, and in four months it would pay for the outlay, and in six months be in a position to give dividends. He also stated "That the surface cost was over 100*l.* per month more than necessary, as every ton of stuff spalled cost double what it would if set by contract, and the cost of the carriage of tinstuff is fearful." In the last five or six weeks two tin dressers have left the mine, and from so-called economy I hear the vacancies are not to be filled. Economy is certainly to be admired in every branch, but the greatest economy (one would think) would be to have a first-class man who knows how to get about a parcel of tin for the market at the cheapest and best rate; one who would not tolerate any interposition from a second agent; and if cost must be lessened, dispense with useless salaried men and extravagancies. INTERESTED.

THE RED RIVER.

SIR,—You are aware that there are numerous companies and individuals who have works on the Red River, on the Camborne and Illogan boundary, for dressing the tin washed down from the mines. Amongst other parties so working are a man called Hocking and Messrs. Joseph Vivian, jun., and Co. A dispute regarding water rights lately arose between these parties, which led to an action—"Hocking *v.* Vivian"—lately submitted to counsel at the Cornwall Assize, but referred to someone whose name has not come to my knowledge. I am not acquainted with the merits of the case, but I find that the decision is adverse to defendant. Arising out of this matter there was another action—"Cartwright *v.* Vivian, jun.—for alleged scandal, which was never committed, and, therefore, defendant refused to make any apology. Notwithstanding, most unaccountably the defendant's counsel did apologise. This has brought forth letters from the defendant stating that he never authorised such a thing, and that some revelations may be expected shortly in connection with the river aforesaid not very pleasant to parties implicated.

Crowan, Aug. 13. OBSERVER.

BRONFLOYD MINE, AND ITS MANAGEMENT.

SIR,—Capt. Kemp, while he answers most of my questions to him in the affirmative, tries to saddle other people with the blunders. * * * Capt. Kemp, in the fulness of his gratitude for many services gratuitously rendered, gives his friend (Captain Henry Boundy) the credit of the dialling blunder. Why does he not honestly admit that he himself knows nothing whatever of surveying? For him to say that the rise was only 3 or 4 feet out of place, while it is admitted that the rise and shaft passed each other for many fathoms without his detecting it, is, on the face of it, either a most deliberate untruth, or evidence of the most reckless bungling ever heard of. It is only fair to Capt. Boundy that we should say the miners assert that Capt. Kemp moved his marks. If Capt. Kemp remembers a stupid lawsuit in which he once involved the company, let him apply the comments made in Court upon his confused evidence upon that occasion to the remainder of his letter, and I need not take further notice of it. His bearing towards his late employers, from whom for many years he received much kindness, is only to be equalled by his attributing to other people his own blunders. He wishes to be excused, it seems, from answering any questions in reference to the Nantycreia management. Well, let it be so, for we have no doubt he has very good reasons for his reticence.

SHAREHOLDER.

BRONFLOYD MINE, AND ITS MANAGEMENT.

SIR,—In so far noticing Capt. Kemp's remarks on my letter, which appeared in last week's Journal, I have only to say that all the statements I have made in reference to his slovenly and unminer-like management of the Bronfloyd Mine can be substantiated, if necessary, by the most respectable mining authorities, and that his imputation of falsehood on me recoils on himself. Suffice it only further to say that I took charge of this mine on Feb. 19, 1872, in consequence of Captain Kemp's letter of resignation, dated Feb. 13, 1872. The shaft was measured on March 1, and its depth below the 84 was then 15 fms. 4 ft. 2 in., leaving only 22 in. to complete the bargain of 14 fathoms. The shaft speaks for itself: from the 96 to the 101 its southern wall is about the shape of half an egg, and, as stated by "A shareholder," "it is impossible to carry the pitwork to the bottom; hence, the lowest level is the 96, which is a great loss to the company. The dresser referred to, who estimated the lead brought by Capt. Kemp to surface, was appointed by himself!

JOHN DAVIS.

TREVARRACK MINING COMPANY.

SIR,—At a time when mining is so depressed and everybody appears out of spirits is the season to look about you and see what you can pick up advantageously. I never see this mine noticed in the Journal, or, at least, very rarely, but I think people ought to be made acquainted with every chance there is of retrieving what has been lost. You have known innumerable instances in which considerable gain has been secured by those who have bought shares when no one else would look at them, and from what I know of this property it will be another case in point before long. You know the district in which the mine is situate; it is one of the finest in the United Kingdom, adjoining Providence, and is traversed by the same cross-courses, and also adjoining Trencrom. Trevarrack has as good a chance as either of them. The shaft has been sunk to a depth of over 60 fms., on a beautifully defined lode averaging about 3 ft. in width, and a large sum of money has been expended on the property. It now appears that after about 20 fathoms more has been sunk the rich tin ground will be reached. Now, about 4*l.* 2s. 6d. per share has been paid upon the shares of this company, and these shares have recently been sold at more than 50 per cent. discount, or at the rate of 2600*l.* for the whole of the property. Surely, persons whom one would suppose to be on the look out for a good chance are overlooking these facts. I did not join the company until a long time after it had been formed, and I have made myself acquainted with its past history, and am exceedingly satisfied that the interests of the shareholders are watched very closely. I understand that a proposition is to be made to convert the company into a limited liability one, which will, I have no doubt, meet the views of the proprietors generally. I surely need say no more to prompt those having any discernment to buy shares in this undertaking. LEX.

WHEAL COATES.

SIR,—It is gratifying to find, amidst the general slaughter of innocents, a few young mines that are answering the expectations raised by their promoters. Foremost amongst these may be mentioned Wheal Coates; started about 12 months since without any great flourish of trumpets, it has quietly progressed. Engines for pumping, winding, and stamping have been erected, the water forked, mine cleaned out, and 10 tons of tin returned, while its future prosperity is established almost beyond a doubt. This mine is an example of what may be done in virgin ground. Only just sufficient was done here to indicate the presence of tin over a great length of as fine a lode as can be seen, and this long before the memory of any living person. But the natural position of the mine, the promising character of the lode, and the amount of work accomplished under extraordinary difficulties, both above and below the adit level, combined to assure the promoters that a good mine would be found, and their anticipations have now been more than verified.

St. Agnes, August 6. NICHOLAS BEYANT.

THE FLAGSTAFF MINE, AND THE "BEARS."

SIR,—As American mines are now engaging public attention, will you kindly afford me space for a few lines on the subject? Last month unfavourable reports were circulated concerning the Flagstaff Mine, by operators known as "Bears," which caused a sudden and considerable fall in the price of shares, almost amounting to a panic. These reports are now proved, beyond a doubt, to have been utterly unfounded, and prices are improving. Finding these tactics to fail, a circular, signed "A Bear," has just been extensively circulated by post, amongst shareholders and others, endeavouring to damage this mine in their estimation, doubtless for the purpose of creating alarm in their minds, and inducing them to sell at a loss. This circular, to which the writer has not dared to attach his name, contains statements which, coming from such a source, are to be received, to say the least, with great suspicion. The cost of printing and posting must have been considerable, yet this noble, disinterested, philanthropic writer professes to be actuated by a desire to benefit men whom he never saw, of whose existence he could scarcely be aware—until he obtained a list of the shareholders' names.

We happen to know enough of human nature in general, and of Stock Exchange speculating, human nature in particular, even to believe that "A Bear" could be actuated by such disinterested motives in forwarding this circular. It happens that these "Bears" have largely oversold Flagstaff shares, but have not delivered them. They are endeavouring to alarm shareholders to sell at a loss that they—the "Bears"—may gain the advantage of purchasing for delivery at lower prices. I am in possession of reliable information from private disinterested sources at the mine, as well as from other reliable sources, and am fully satisfied that the statement is correct that there is now far more ore in sight than there was 18 months ago—probably over three times as much; that the ore now in sight alone is sufficient to pay the usual dividend of 30 per cent. for the next two years at least, and further discoveries of ore being made; and that, when the re-lining of the furnaces is completed, in a few weeks, the profits will be largely in excess of amount required for dividend, when a reserve fund may at once be created to meet any future contingency. Under these circumstances, I ask what ground there can be for a panic, except to fill the pockets of "Bears" at the expense of timid shareholders? An opinion is strongly held by many who are an authority in these matters that before the end of the present year, when "Bears" have bought largely at a low price, they will turn "Bulls" in order to sell high, and that these shares will be higher than ever—perhaps even 17*l.* or 18*l.* per share.

As to the nefarious practice of circulating false reports from selfish motives, every honest man must regard it with indignation. If a highwayman demands my money I have the opportunity of a fair fight for its possession, though the robber may assure me plausibly that for my own good he wishes to relieve me of my money, that he knows I have much more than is good for me though I may be unconscious of the fact, and though public opinion may be against gentlemen of his profession yet the time will come when I shall confess he is my best friend. A "Bear" of shares comes to my property, saying your shares are too high, though you may be ignorant of the fact; I wish to relieve you of part of your money by depreciating their value. I am a disinterested philanthropist, and your best friend; public opinion may be against me, but the time will arrive when you will thank me. I ask is there not some analogy between the two cases? The highwayman, however, gives me a chance to defend my property, the "Bear" gives me none. Let me urge my brother shareholders not to be alarmed by disinterested (?) "Bears" into selling their shares at present prices, but tenaciously hold for dividends and a rise.

Compare the price of Flagstaff shares with other shares and their value will be evident. Emma shares are now 4*l.* 10s., said to be worked out, and paid no dividend for months; Last Chance, 5*l.* 10s. paying 2s. per share per month; Flagstaff, 10*l.* per share, in good condition, with good prospects, paying 5s. per month. Are they not, I ask, the cheapest mining shares in the market? whatever the "Bears" may say to the contrary. Notwithstanding their disinterested operations, I intend to continue— A SHAREHOLDER.

UTAH SILVER MINES.

SIR,—In a circular signed by "A Bear," and addressed to the shareholders in the above mines, the following passage occurs:—"The talented vendor or promoter of the mines in question recently urged me strongly to turn 'Bull' of the shares, giving, as his inducement, the absolute certainty that the Flagstaff would go on paying dividends until October at least." Will you allow me to ask, through the Journal, whether this statement has any foundation in fact?

A FLAGSTAFF SHAREHOLDER.

SPECULATING IN FOREIGN MINES.

SIR,—In reference to "Mining Engineer's" letter, in last week's Journal, it really is nonsense for anyone to talk of Mr. Park being himself deceived as to the condition of the Emma Mine when he sold it. Does "Mining Engineer" know that Mr. Park admitted to an American gentleman, now in London, that the large chamber of ore was nearly worked out, and that he did not think the mine was worth more than $250,000, but that it would sell in England on the strength of its past reputation? Does "Mining Engineer" know that the mine was skilfully prepared for examination of experts by Silas Williams, acting under Mr. Park's directions, for the purpose of deceiving those who came to examine it, as testified to by a British miner now in Cornwall, named W. Eddy, who worked in the Emma at this very time?

Does "Mining Engineer" know that Mr. Raymond, the United States Government official, who inspected the mine only a short time before Prof. Silliman, gave a very different account of its prospects to that the Professor did, and that Mr. Raymond's report was carefully kept back?

If "Mining Engineer," or any of the Emma friends, are still of opinion that the mine is worth anything, are they open to back their opinion; because I can produce a gentleman of perfectly solvent means who is prepared to stake 100*l.* against a like sum that the Emma Mine never pays another fair dividend out of ore raised from it. I say fair dividend, because the last two were paid out of borrowed money from Park, as the first five were paid out of cash handed over by the same individual, acting for the vendors. If the Emma goes on working much longer in the direction they have hitherto found ore (south-east to north-west) they will strike the North Star Mine, owned by J. K. Bruner, of Philadelphia, and which, after being worked for four or five years, has barely paid its expenses; and if they work on the line their patent runs they will not find much ore, as the whole ore-bearing strata of the country run in a different direction.

I am neither a "Bear" or a "Bull," but simply an unfortunate Emma shareholder, who happens to know more than the majority of my brethren do.

44, *Tinsley-hill, Wandsworth, S. W.* ——— S. T. FAYARD.

CUIABA GOLD MINING COMPANY.

SIR,—By the letter of "A Shareholder" in last week's Journal it appears that this company is being wound-up under a petition of the secretary, and "A Shareholder" hopes the property will not be disposed of for a mere nothing. The shareholders cannot, so far as I can see, derive any benefit from its sale, as the contract with the vendor has not been carried out. The company was brought out with a proposed capital of 100,000 shares of 1*l.* each, under the management of five directors, one of whom was at the mine, for which he received 42*l.*, and 15*l.* 8s. 8d. travelling expenses, for his so-called management.

Now, looking at the statement the prospectus put forward, not speculative, but as absolute facts, the conduct of the directors in proceeding with the company in the face of the fraction—3589—of the shares applied for and issued to the public, upon which there appears to have been paid 250*l.* 20s., the conduct of the managing director at the mine and various other matters requiring investigation, I would suggest a meeting of the shareholders, when I am certain it will be seen that the directors can be made responsible to the shareholders for proceeding with the company under circumstances so unjustifiable. ANOTHER SHAREHOLDER.

Glasgow, Aug. 13.

[For remainder of Original Correspondence see to-day's Journal.]

THE EMMA MINE.—We are happy to be able to announce that the Emma, the very queen of Utah mines, has again assumed, in a partial but encouraging degree, her former position as a grand silver ore producing mine. From various causes the Emma has been under a cloud for several months, and the bad effects of the evil croakings in England and America concerning the unfortunate situation of the mine, have had a most depressing effect on the mining prospects of Utah, here and abroad. The mine was for a long time the leading one of the territory, and better known the world over, perhaps, than any in the country next to the Comstock lode. The so-called failure of the mine acted as a wet blanket on all operations in Utah mines here and abroad. Everyone thought because the Emma had failed and British stockholders had lost largely in their investments in its stock, that there could be nothing in Utah. The mine represented to the great mass of the people Utah's mineral wealth, and when it fell everything in the territory got a "black eye," as they say, on change. It is for this reason that we are glad to be able to say, on excellent authority, that the Emma is again in a most flourishing condition. Work is now being done on a large body of ore, which was discovered some months since, and which we alluded to at the time, and ore is now being shipped and sold here in considerable quantities which assays, in the sample mill, 55½ ozs. of silver to the ton, and carries 50 per cent. of lead. A number of tons of this grade have already been sold at this rate, and a large quantity is awaiting shipment. Two carloads going 200 ozs. to the ton were sampled yesterday, and plenty more is coming. Under these circumstances, and with the promising future before it, we cannot hesitate to congratulate the stockholders on the brilliant prospects of the mine, and express our satisfaction at the turn of affairs which have been going somewhat adverse to the best interests of the territory.—*Salt Lake Journal.*

MEXICAN MINES IN LONDON.—By the English packet we have very encouraging reports of the prospects of Mexican mining enterprises from London. We learn that Mr. Petherick is desirous that some of the best mining properties held in Mexico should be shared with English capitalists. During the observations of four years in Mexico, Mr. Petherick has been able to judge of the merits of various properties, and aware of the vital importance, in this crisis of Mexican mining affairs, of a few successes, he is offering in the London market only a few well selected enterprises in which he can with all safety pledge himself that English subscribers shall not lose. We say this because all here who know Mr. Petherick can testify that where he has been properly supported he has more than redeemed his promises on former occasions, and, indeed, we may say that in certain cases where he has not been well supported he has, in union with Mr. Potts, Mr. Bishop, Mr. Gorsuch, and Capt. Grose, at great personal and wholly unremunerated expenditure, preserved the rights and titles of parties to large and most valuable mining properties. We think, therefore, that all those English capitalists who may invest in Mr. Petherick's enterprises will become good friends of Mexican mining concerns, because we feel sure they will make money in the operations he proposes to them. In another column will be found the latest statements of operations in the mines of the Puerto Mining Company, in Guerrero, which lie near the property of the Guerrero Company, of London, which was the pioneer English company in that part of Mexico, and the gold veins already discovered are a sufficient guarantee for the success of the three companies. We may also mention as another successful London enterprise the New Rosario Silver Mining Company, whose properties lie in the district of Real del Monte.—*The Cosmopolitan:* Mexico, July 1.

NEW SOUTH WALES.—A letter from Sydney, June 14, says—"A shade has come over mining enterprise. Not that the gold is to blame but the absurd expectations of foolish people who preferred their own conclusions and visions to facts. The companies have been fearfully mismanaged, and nothing now has a chance of floating. The share market is absolutely stagnant, and this notwithstanding the raising of splendid stone and the opening of new veins or claims supposed to be worked out. For instance, Carroll and Beard have just crushed 5252 ozs. of gold, and 200 ozs. of tailings, from 41½ tons of quartz. That is not a result to run away from. Copper mining proceeds with activity. As the sale of mining scrip decreases, the demand for dividend-paying stock of a more permanent description increases. Monetary matters here are in a good, sound state, and money is plentiful: but it is expected that the loans now on hand will absorb it, and produce a change."

SEARCH FOR COAL IN VICTORIA.—Nothing could be more advantageous to the interest of the colony (says the Melbourne *Argus*) than the opening up of a remunerative coal field. From the indications which present themselves in so many localities, and indeed, judging from the coal which has already been obtained, there can be but little doubt that good coal fields do exist in Victoria. Hitherto, however, the coal deposits which have been discovered have only been worked at or near the outcrop, and no systematic endeavour has ever been made to trace them to where the disjointed seams might be expected to become thicker and more valuable, or to ascertain the extent of our carboniferous formations. The recent high price which coal has attained, and the comparative uncertainty of the supply have, however, impressed upon the attention of the Government the great importance of this subject. When the Chief Secretary was at Sydney, during the late Inter-colonial Conference, he requested Mr. Parkes to allow Mr. John Mackenzie, the Government Examiner of Coal Fields in New South Wales, to visit Victoria, for the purpose of examining and reporting on the coal fields of this colony, with a view of informing the Government whether, in his opinion, coal exists in sufficient quantities and under such conditions as to justify the expectation that the seams can be worked to a profit. At that time Mr. Mackenzie could not be spared from his official duties in the neighbouring colony. We now learn, however, that his Government has consented to his visiting Victoria, and that he may be expected here in the course of a month. Mr. Mackenzie is a gentlemen of great practical experience, and his report upon our coal deposits can hardly fail to be of the most interesting and valuable description. He has soon specimens of the coal found in Victoria, and, without committing himself to any definite conclusion, he has expressed an opinion that there must be good seams of coal somewhere in the neighbourhood of where these specimens were found. Steps are being taken by the Government in various ways to prove the value of our coal deposits. It was stated last month that contracts had been let for putting down trial shafts at Western Port, and information is now being sought in another direction. Mr. John Mackenzie, the Government Inspector of coal fields in New South Wales, has, at the request of the Chief Secretary, been allowed to examine and report upon the coal fields of this colony, with the view of informing the Government whether in his opinion coal exists in sufficient quantities and under such conditions as would justify the expectation that the seams can be worked to a profit.

SCIENTIFIC HANDICRAFT.—The constantly increasing attention paid to the study of physical science has caused experimental lectures in physics to become exceedingly popular with general audiences, yet amateur lecturers have often felt diffidence in handling the subject, in consequence of the difficulty they have found in selecting cheap pieces of apparatus suitable for illustrating their lectures. In his handsome little volume—"Scientific Handicraft"—Mr. J. J. Griffin, F.C.S., has supplied them with abundance of information to relieve them of all trouble in this respect. The volume in question, which is published by Messrs. John J. Griffin and Sons, the well-known chemical and philosophical instrument makers, of Garrick-street, Covent-garden, is a descriptive, illustrated, and priced catalogue of apparatus, but it is transformed into a readable book by accompanying each piece of apparatus with a sketch of some telling experiment for the performance of which it may be used. Mechanics, hydrostatics, hydrodynamics, and pneumatics are the portions of the physical sciences to which the catalogue refers, and from the systematic arrangement adopted the amateur lecturer of moderate ability would find but little difficulty in supplying a good outline of the subjects with no other assistance than that which the book affords. The book will, doubtless, be extensively patronised.

JOURNAL OF THE IRON AND STEEL INSTITUTE.—The first volume of the Transactions of the Institute for the present year, which has just been issued (through Messrs. E. and F. N. Spon, of Charing Cross), is occupied chiefly with the report of the proceedings of the annual meeting, and contains the several papers of which abstracts were published in the *Mining Journal* of May 3 last. There is also the usual quarterly report on the Progress of the Iron and Steel Industries in Foreign Countries, by the foreign secretary to the Institute, Mr. David Forbes, F.R.S., which contains a large amount of information. The volume is a particularly interesting one throughout.

CUTTING DIAMONDS.—Mr. M. FIELD, of Boston, U.S., has patented some improvements in machinery for cutting diamonds or other gems, which consist—1. Of a primary bed plate made adjustable with respect to a tail stock or carriage holding the stone to be cut and bearing an adjustable tool carrier or stock, which is driven backward and forward on the main bed by suitable means.—2. In the peculiar construction of the tool carrier, whereby a universal freedom of motion is obtained.—3. In the peculiar construction of the tail stock or carriage, which holds the stone while being cut, to adapt the machine to cut gems of differentsizes, or to adjust the position of the gem or cutting tool in order to obtain a universal variable motion of the gem or tool, so that any face may be cut upon said gem.

STEAM-BOILERS.—The invention of Mr. G. QUIMBEL, of Ilfhelf, relates to a construction and arrangement of steam-boilers and their flues and heating surfaces, so as to utilise to the greatest extent the heat of the fire. The body of the boiler is made of crescent shape, the hollow of the crescent forming a fire-place and flue. In this flue and in flues in the setting on each side of the boiler are placed cylindrical generators, communicating by large ducts with the boiler. Below the boiler the flue is carried downwards and to and fro in a zig-zag direction, and in each of these zig-zag channels is placed a tube communicating at opposite ends with the tubes above and below it. The feed water is supplied to the lowest and coolest of these tubes, and is heated as it passes upwards to a tube placed in the ashpit, which communicates with the boiler by its side generators. The products of combustion after leaving the last of the zig-zag flue channels are carried through zig-zag pipes of thin metal placed in a chamber through which air passes to the boiler fire, the air being thus heated and the products of combustion cooled before they escape to the chimney. For starting the boiler a valve or damper is opened, permitting the products of combustion to pass directly from the side flues of the boiler to the chimney until the draught be established.

Prevention of Colliery Accidents.

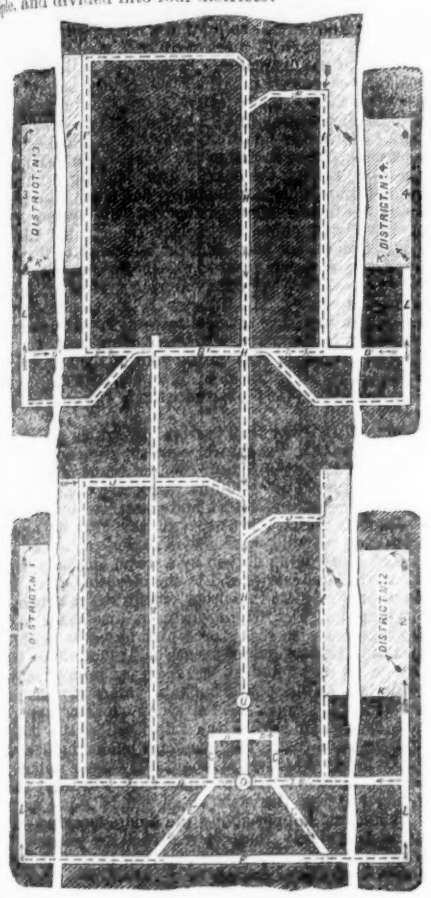
Mr. HERMON'S PRIZE ESSAYS.

MR. WILFRED CRESWICK'S FIRST PRIZE ESSAY—No. III.

The laying out of workings for a new colliery is a most important operation, and in this I think the engineer should consult the Inspector—*i.e.*, the engineer should lay on the plan of the properties to be wrought the mode in which he intends the workings to be arranged; a copy of this, as agreed to by both engineer and Inspector, should be sent to the latter, so that he will have it to refer to at any time, and the engineer must work to this plan; of course, reasons may arise why the plan should be altered, but the Inspector's sanction should be obtained (in writing) before any alterations are made. Inspectors should be satisfied that every colliery has the necessary amount of ventilation to render harmless noxious gases (see General and Special Rules, No. 1), and until he gives notice (in writing) to the colliery manager that there is not sufficient ventilation it should be considered that, *up to the time of that notice*, the Inspector was satisfied with the ventilation, for the terms in the rules are necessarily vague.

In future deep collieries there should only be two connections with the intake for each district—one to take the air to the end of the district farthest from the upcast, and the other to bring the coals, &c., direct to the shaft (the drawing-shaft should, if possible, always be a downcast, and only one connection with the return. No slits between intake and return air, with stoppings or doors in them (excepting where absolutely necessary), should be allowed. I think my meaning as to the general arrangements of the workings for a new colliery will be better understood by referring to the following plan and explanations.

The subjoined plan shows a colliery laid out on the long wall principle, and divided into four districts:—



NOTE.—A water gauge through the doors of each district would be useful, as it will keep a check on the state of the airways in each district. The *arrows* denote the course of ventilation.

All colliery workings should be divided into districts, having no connection with each other except those mentioned in the previous paragraph. The mode of operations on the shafts reaching the coal should be something like the following, viz.—Drive a communication between D (the downcast) and U (the upcast) shafts, and fix a temporary door (or double doors) at No. 1, then by the aid of air-pipes passing through this door proceed to make the headings B, C, D, and E, F, G; now remove the air-pipes, and place temporary doors, No. 2 and 3, also a temporary regulating door, No. 4; continue driving headings, B, in both directions, leaving along the middle of these headings pillars of coal (see dotted lines on plan) to answer the purposes of temporary ventilation more safely than brattices; these pillars need not be more than 2 or 3 feet thick, and should be removed when the headings are completed: F can also be driven in a similar manner, the post to be taken out when completed, but the tramway should be left in (or laid), so that there may be no inducement at any time, when F may require cleaning out, for a slit to be driven between the horse-road B and the main intake F; H, I, J must also be driven with pillars and air-pipes, for conducting ventilation, to be afterwards removed; K, and the further extensions of B, may be driven in the usual way, with the aid of brattice and slits, L.

Now the districts Nos. 1 and 2 are opened out, and the permanent double doors (shown thus × ×) must be fixed, and a boy must always attend on them (see Special Rules, Nos. 17, 68, and 69); there should also be fixed, and set back in the solid coal, two sets of duplicate doors (which should be kept open), so that in the event of an explosion taking place these doors may be out of the blast, and used immediately to replace the ordinary doors (shown thus × ×), which might be blown away. The pillars* shown by the dotted lines, and all temporary doors, &c., must now (if not already done) be removed, and districts Nos. 1 and 2 will be ready for opening out the banks. Two very strong stoppings, each built on the same plan as previously shown, must be placed in the heading between the two shafts (*i.e.*, between heads D and shaft U), having strong iron doors (so arranged as to act as scale doors) in them, opening different ways, and locked, the under-viewer and deputies only having keys.

Thus, in the event of an explosion, the workings are so laid out that the blast and after-damp will not extend beyond the district in which it occurred, and provided the duplicate doors are closed (if the others have been blown away) the ventilation must quickly sweep away all after-damp—which is much more fatal to life than the actual explosion, owing chiefly to the collieries having so many doors and stoppings, any of which being blown away would cause stagnation of ventilation in some portion of the workings—and fresh air and help speedily reach the scene of explosion. The men not actually disabled by the explosion would know which way to run, in order to reach the fresh air more speedily, because there are no stoppings and doors to be swept away, for there would speedily be help at the shaft bottom to attend to the only doors required.

I will now assume that districts Nos. 3 and 4 are required to be opened out. Another intake (M) must be driven, which can be done as follows—having driven M a few yards, and made a slit in the temporary posts, place an air-pipe through the main doors (shown thus × × on the plan), which must extend a short distance along one of the heads of M, the end of which (head) must then be closed, the necessary circulation of air will be promoted through the air pipe; now continue driving M till J is reached, and a strong cast-iron air-crossing must be fixed immediately, as previously described; the head M can now be continued till B′ is reached, when the roads B′ must be pushed on in both directions; in the meantime head H should be continued, with the aid of small pillars for ventilation, till the point N is reached. At the junction of H and B′ another strong air crossing, similar to that at the junction of M and J, must be immediately erected (it is important that these "overcasts" or air crossings be put in as soon as possible after the meetings are effected, for if an explosion were to happen before they were erected the doors and other contrivances which would have to be used in their place would probably be blown down, and then the air would take the short way to the upcast, and leave the working districts without, and it would then be vain to attend to the doors (marked thus × ×); the next step is to form a communication between B′ and H, *via* I′ and J′; this being done a complete and independent circulation is promoted through the new in-take M. The further opening ont of districts Nos. 3 and 4 will be something similar to districts Nos. 1 and 2. Pack walls in 'banks" or "wastes" should have openings left in them (say) every 5 yards, so that a circulation of air may be kept up through them.

I have divided the ignition of explosive mixtures under two heads, and will now proceed to show how danger from these causes may be remedied:—

(A.) The men will be prevented from lighting matches or candles, &c., where safety-lamps are used—tampering with their safety-lamps, or working with one that has been damaged, &c., &c.—by the vigilance of the overlookers. Where safety-lamps are used a lamp cleaner must be appointed, who will see that no defective lamp is given to the men. The lamps should not be set on the floor of the mine, but hung or suspended from rings. The lamp keeper and men must also comply with Special Rules 2, 34, 39, 65, 66, 67, 29, 30, 32, 33.

The surest plan of dealing with blasting-powder is to prohibit its use altogether where safety-lamps are required, as defined in this essay, and where not; the material to be blasted should first be cut (if possible) so as to prevent the charge from being blown out in a stream of fire—*i.e.*, the line of least resistance should be so arranged as to cause the stratum to be shattered to such an extent that little or no flame will be blown out of the drill-hole.* On approaching old workings not *known* to be *entirely* without gas, no blasting-powder or naked lights should be used, and men over whom air from this place will pass must use safety-lamps until the workings have been satisfactorily proved. No man should be allowed to work in or near an explosive mixture and if such mixture exists the underground viewer must personally superintend its removal.

(B.) Spontaneous combustion may arise from various causes, and, amongst others, sulphuret of iron (iron pyrites) may produce fire, and also may greasy waste. Phosphorus will combine with hydrogen, and produce phosphoretted hydrogen gas, which will take fire spontaneously in atmospherical air. The only remedy is to keep the workings free from all substances likely to fire spontaneously, or produce phosphorus, by sending them out of the pit.

No. 3.—SUFFOCATION FROM THE EFFECTS OF GASES UNFIT FOR THE SUPPORT OF LIFE.—This may be caused by not having sufficient ventilation, the remedy for which has been described; or by a current of air taking bad air through the workings—say, for an instance, any part of the workings taking fire over which the current of air passes. Thus, the whole of the pit ventilated by this air would be foul, and might suffocate the men; but in the event of this happening, the advantage of introducing the intake air into a district at the end furthest from the downcast shaft is apparent, for the men in this case could escape through the doors, shown thus × × on the above plan. The stables should always be ventilated by a separate split of air, which should be then taken direct to the upcast. Water should be passed down the shaft to the stables, and a hose kept ready to be fixed at any time should they take fire.

It would be well if in colliery districts fire-engines were made to run on trams, and small enough to be taken up and down shafts, so as to be available underground in case of fire.

Suffocation takes place by inhaling the after-damp arising from an explosion, and I may here repeat that more deaths under the head of explosions arise from this cause than from the blast and fire of the actual explosion; this will be found to be treated on under the head "No. 2, Explosions of Fire-damp." Two downcasts are better than one, for if a fire took place in one of them there would be the other to flee to for refuge and fresh air.

No. 4.—INUNDATIONS OR FLOODINGS OF WORKINGS BY A SUDDEN INFLUX OF WATER.—This may be divided under two heads:—

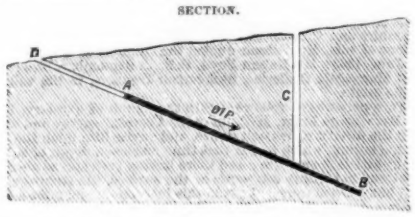
(A.) From water in or near the same plane as the workings, by approaching so near that its pressure will cause it to burst into them.

(B.) From water vertically above the workings, by not leaving sufficient supports underneath.

It is much to be deplored that formerly very inaccurate plans were kept of coal workings, as they are liable to lead persons astray, and as long as they trust implicitly to old plans for guidance so long will mines be subject to frequent inundations.

(A.) Prevention of accidents from this cause. The following sketch will tend to illustrate my meaning:—

SECTION.



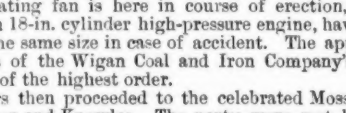
A B is the stratum of coal to be wrought to the shaft, C; A D are old workings filled with water, the position of which are shown on an old plan or otherwise. It is necessary before any extensive workings are opened out between the shaft, C, and the old workings, A, that a heading should be driven to prove the position of A, but before this is done extensive workings should be made to the dip of C, so that in the event of the heading coming suddenly upon the old workings, or a quantity of water suddenly forcing its way through the roof or floor, this water will find its way into the dip workings, and before it reaches the shaft the men will have had time to escape.

Suppose the dip workings to have been made, and the heading driven to prove A to be rapidly approaching the position of A, as shown on the old plans or elsewhere, bore-holes of a certain length must now always be kept in advance of the heading, thus—

PLAN.

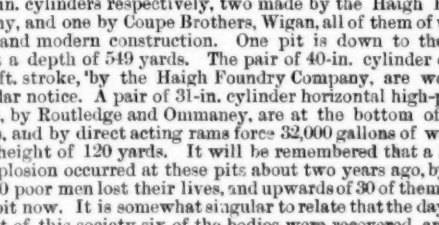
The length of the bore-holes should depend on the size or section of the heading, strength of the coal, and head of water contained in the old workings; thus the water will be prevented from suddenly bursting through the coal, but still it might burst open the floor or roof.

Now, suppose the old workings to have been bored into out of the exploring heading without any mishap, it may be desirable to let the water run gradually down to the pumping-shaft, and so be raised to the surface; or, perhaps, to leave a barrier of coal against the old workings, and so keep the water out of the present workings altogether. I will suppose the latter to be decided on; in this case, commence to drive a heading out of the exploring heading already driven (at a suitable distance from the old workings, depending on the strength and thickness of the coal and the head of water to be contended against) parallel with the old workings, as shown on the old plan, taking care to always keep bore-holes in advance and on the rise side of the heading, thus—



When this has been extended to a suitable distance the coal on the deep side of it may safely be extracted *en masse*, provided that the water in the old workings is the only danger to contend against.

The plan of a colliery at this stage would appear something like this—



Extensive workings on the deep, the extent depending on quantity of water to contend against.

(B.) Prevention of accidents from this cause. The only method of dealing with water—vertically above the coal stratum being wrought—is to keep accurate plans of the workings and surface, and, if need be, leave pillars to support the water above (when the water is in old workings the old plans will have to be trusted, to a certain extent, and a large margin allowed for error), when the workings approach where it is stored; but extensive dip workings should exist when water is in question before approaching the place supposed to contain it. When I say "dip workings" I do not mean that it is necessary that the workings should be below the pumping-shaft, but I mean that there should be a ready means for the escape of the men at a higher point above some extensive workings or "goaf."

[*To be continued in next week's Mining Journal.*]

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* In some collieries these pillars might be made thicker, and, with advantage, left as fixtures, in which case a fall of roof taking place in one road the ventilation will not be entirely stopped.

* Blasting the roof of a mine is evidently dangerous. All beaters used to "ram" shots should have copper or brass heads, so as to prevent sparks being struck from the coal on ramming.

THE SOUTH STAFFORSHIRE AND EAST WORCESTERSHIRE INSTITUTE OF MINING ENGINEERS IN LANCASHIRE.

Last week the members of the South Staffordshire and East Worcestershire Institute of Mining Engineers, of Dudley, made an excursion into Lancashire. Every arrangement was made by Mr. H. JOHNSON, jun., the secretary, for the convenience of the party.

The Wigan district stands pre-eminent, it may be said, throughout the world for deep mining and most approved and extensive mining appliances; and, therefore, great interest was attached to the inspection of some of the largest and best collieries in that important district by the party. On Monday they left the Dudley Station of the London and North-Western Railway, at 8 50 A.M., in two saloon carriages, and proceeded, *via* Dudley Port and Wolverhampton, to Wigan, where a special engine was in waiting to convey the party to the Wigan Coal and Iron Company's extensive ironworks and collieries. Here they were received by Mr. A. Hewlett, and afterwards made an inspection of them. The party consisted of Messrs. W. Blakemore (President), J. Field (Vice-President), Henry Johnson, sen. (ex-President), J. Lindop, H. M. Morrison, S. Spruce, J. Lawley, J. M. Fellows, T. Roper, J. R. Cooksey, F. Parkes, A. H. Lindop, W. D. Munro, W. Bagshaw, R. Dodd, G. Spruce, T. Williams, J. Turley, T. Lloyd, T. Rollason, T. Goring, H. Hughes, F. Holcroft, J. Williams, N. Dunn, W. Thorntons, J. Owen, W. H. Fisher, J. Fisher, W. Shorthouse, O. L. Lucas, J. Onions, W. Barnett, S. Saunders, T. Yates, T. Holland, R. C. Kyrke, J. Darlington, and H. Johnson, jun., secretary.

The Wigan Coal and Iron Company's works consist of 10 modern blast-furnaces—five 65 feet high, 19 feet bosh, 7 feet 6 inch hearths; five 80 feet high, 20 feet bosh, 8 feet hearths, all cased with boiler plate in a very neat and substantial manner. All of them work with closed tops, from which the gas is taken to the hot-air ovens and the boilers. The blast-engines are three in number, in one house, and are of the most modern construction, built by Nasmyth and Co., having six blowing cylinders, 100 in. in diameter, working a 12-ft. stroke, with high and low pressure cylinders to each engine, with massive cast-iron beam fixed on the ground floor. There are 16 high-pressure double-flued boilers set in one bed, each 7 ft. 6 in. in diam., 28 ft. long, and fitted with all modern improvements. The stack is round, and 350 ft. high, 13 ft. 6 in. inside diameter, built from an octagon base. The visitors next inspected, under the guidance of Mr. Jackson, mining engineer, the Lindsay pits of this company, where a pair of 36-inch cylinder high-pressure engines, 6-ft. stoke, were at work, of excellent construction, by Coupe Brothers. A 20-ft. Guibal ventilating fan is here in course of erection, and will be worked by an 18-in. cylinder high-pressure engine, having a duplicate engine the same size in case of accident. The appliances and appointments of the Wigan Coal and Iron Company's works and collieries are of the highest order.

The visitors then proceeded to the celebrated Moss Colliery of Messrs. Pearson and Knowles. The party were met by Mr. J. E. Pearson, one of the proprietors, who conducted them over the extensive plant, consisting of four pits 15 ft. in diameter, each worked by three pairs of horizonal high-pressure winding engines of 28, 32, and 40-in. cylinders respectively, two made by the Haigh Foundry Company, and one by Coupe Brothers, Wigan, all of them of very excellent and modern construction. One pit is down to the cannel coal, at a depth of 549 yards. The pair of 40-in. cylinder engines, with 7-ft. stroke, by the Haigh Foundry Company, are worthy of particular notice. A pair of 31-in. cylinder horizontal high-pressure engines, by Routledge and Ommaney, are at the bottom of one of the pits, and by direct acting rams force 32,000 gallons of water per hour a height of 120 yards. It will be remembered that a lamentable explosion occurred at these pits about two years ago, by which about 70 poor men lost their lives, and upwards of 30 of them remain in the pit now. It is somewhat singular to relate that the day before the visit of this society six of the bodies were recovered, and were inspected by the visitors, and a sad sight it was; but, considering the long time they had been entombed, they were fortunately recognisable by their relatives. The party then took to their saloon carriages, and soon found themselves at that pleasant seaside watering-place, Southport, where they stayed for the night.

On Tuesday morning the party proceeded by special engine to the Pemberton Colliery of Messrs. J. Blundell and Son, and were kindly taken in hand by Mr. W. J. L. Watkin, the manager, and Mr. Shortrede and Mr. Humble. This colliery is about 1¼ mile from the town of Wigan, and the new portion of the plant is of the most substantial and modern construction, and reflects the highest credit on all concerned. The pits are 640 yards deep; one is 17 ft. 4 in. diameter, the other 19 ft. 4 in., and are worked by two pairs of 36-inch cylinder horizontal high-pressure winding engines, 6-ft. stroke, of very superior and modern construction, by Robert Daglish and Co., St. Helen's, and are driven by 16 boilers. The pulleys are 18 feet diameter, and round steel wire-ropes are used. One winding drum is conical (Burrow's patent), having a maximum diameter of 30 ft. 6 in., minimum diameter 19 ft., and will wind 624 yards in 21 revolutions. The engine-house, containing the four engines, is 121 feet long. A new Guibal ventilating fan is at work, 46 ft. diameter and 15 ft. wide, worked by a 36-inch cylinder high-pressure horizontal engine, and and there is a duplicate one of the same size attached to the same bed in case of accident with the other. These engines are worthy of strict mention, Haigh Foundry Company being the makers. The ventilating fan is capable of producing, at 60 revolutions per minute, 270,000 cubic feet of air per minute. The pit frames, 55 feet high, are made entirely of steel, and are on the lattice principle, and, although they appear very light in structure when winding at high speed do not exhibit the least vibration. The tubs, wheels, and axles, weighing only 3½ cwts. each, are made entirely of steel, and are very light and portable. The cages have three decks capable of

carrying six tubs, are also made of steel, and only weigh 28¼ cwts. each, carrying 7½ cwts. of coal each tub. These pits, 624 yards deep, were sunk in two years and three months. A fault, or downthrow, runs through this colliery, which throws down part of the mine as much as 500 yards below the other. After the surface inspection the members descended the pit, and witnessed the working of Winstanley and Barker's patent coal-cutting machine, which worked admirably. The machine is worked by compressed air, by a 16-inch cylinder high-pressure engine at the surface. The compressed air is carried down the shaft by 3-inch cast-iron pipes, and near the machine by a 2-inch vulcanised India-rubber hose, capable of standing a pressure of 120 lbs. to the inch. The machine cut at the rate of 30 yards an hour, 20 yards an hour being its regular rate of working. It cut a horizontal groove along the face of the coal (8 inches from the floor) 2 ft. 8 in. under, and about 3 in. high. The cutting produces fine slack, which is used for coke making, and the coal above and below the groove is very easily got down and benched up ready for loading in the usual way. The machine is a decided improvement on manual labour, both in time, expense, and the marketable value of the coal when got, and must soon come into general use. The machine was worked at a pressure of about 40 lbs. to the square inch, and although it was working more than 1000 yards from the compressing engine on the surface, there was only a loss of pressure of about 5 lbs. to the square inch in transit. One man and two boys worked the machine, which costs only about 120*l*. The seam in which it was at work was the Wigan Four-feet.

On returning to *terra firma* the company partook of refreshments, and Mr. Watkin stated the great pleasure it gave him to meet them on that occasion. The members expressed themselves as highly gratified with what they had seen, and were much struck with the magnitude and completeness of the plant above ground, remarking that the scale of operations was far more colossal than they were themselves accustomed to see in the Staffordshire mining districts.

The inner man having been attended to, the company took their seats in the train, which had been brought round to one of the colliery sidings, and were conveyed, *via* Brynn and Springs Branch, passing many important and extensive collieries on their way, to the middle works of the Ince Hall Coal and Cannel Company. Mr. Gilroy (the company's manager) received the visitors, and, conducting them along the platform, showed them the endless chain system at work at the collieries of the company, and they were afterwards taken to the East Pit, in which a seam 18 in. thick is got. The pit was at work, but as the stay at Pemberton had been rather lengthy the members did not descend. The system of endless chain haulage on bank took the particular attention of the visitors, the produce of many pits being brought to one common centre for screening and loading, entirely dispensing with horse-power. Some of the pits were as much as 500 yards away from the depôt, and the endless trains of tubs could be seen rolling along, producing almost mountains of coal, and nearly self-acting.

On leaving the East Pit the members returned to the train, which shortly landed them at the renowned Rose Bridge Colliery, where there is the deepest pit in working in the world, the property of Mr. J. G. Morris. Here they were received by Mr. W. Bryham, Mr. J. Bryham, and Mr. W. Bryham, jun., by whom refreshments were kindly provided, and, having donned suitable habiliments, which were in readiness, the members descended the deep pit to the Arley Mine, which is at the extraordinary depth of 806 yards. Previous to this, however, the excellent winding plant was inspected, and the instantaneous response of the immense drum to the steam brakes when applied was much admired. There are two pairs of high-pressure horizontal winding-engines, by Daglish and Co., of most modern and excellent construction, with powerful foot and steam brakes. The deep pit is worked by a flat steel tapered rope over drums 26 feet in diameter, and there are 13 boilers in all. The time in which the party descended was 45 seconds, which is at the rate of 37 miles an hour, but, as this includes starting and stopping, 400 yards of the shaft must have been run at 50 miles an hour. All those who descended appeared delighted with the perfect smoothness with which they had descended such a great depth in so few seconds, but everyone experienced a temporary deafness on arriving at the pit bottom from compression on the drums of the ears.

The party then proceeded to examine the Arley Mine at a distance of about 500 yards from the pit bottoms, which is about 4 ft. thick. Printed sections of all the strata passed through in this wonderful sinking were kindly presented to each of the members present, giving a detail description of all the coals passed through, and, what is equally interesting, the temperature of the earth at different depths, of which the following table is a copy:—

Total depth.	Degrees.	Total depth.	Degrees.
558 yards	78	745 yards	89
605 ,,	80	761 ,,	90½
630 ,,	83	775 ,,	91½
663 ,,	85	783 ,,	92
671 ,,	86	800 ,,	93
679 ,,	87	806 ,,	93½
734 ,,	88½	815 ,, (total depth)	94

The holes used in taking the temperature were made in the solid 3 feet, and allowed to remain 30 minutes before observation. The members spoke in high terms of the treat that had been afforded them, and before retiring to Wigan some of them examined the plans and sections of the workings; and this privilege was also very kindly accorded at the Pemberton Pits by Mr. Watkin. The winding-engines at the deep pit were the theme of admiration by all the visitors, and the perfect control which the engineman had them under was most remarkable.

The special train then conveyed the members to the Wigan Station of the London and North-Western Railway, whence they proceeded to the public hall for the purpose of partaking luncheon, kindly provided by the following coal proprietors of the neighbourhood, the arrangements having been in the hands of Mr. J. E. Pearson, as honorary secretary:—Wigan Coal and Iron Company, Messrs. Blundell; Ince Hall Coal and Cannel Comyany, Messrs. Pearson and Knowles, T. G. Morris, J. Crompton. Lamb and Moore, Cross, Tetley and Co., Rylands and Son, Mercer and Evans, Braucker, Hindley Green Company, Brinsopp Hall Company, Moss Hall Company. The caterer was Mr. Eberle, of the Alexandra Hotel, Liverpool, and the *menu* was excellent. Mr. G. Gilroy occupied the chair, supported right and left by Mr. W. Blakemore, president of the institution, and Mr. W. Mayhew, of Wigan. Besides the visitors there were also present Messrs. J. Cross, W. J. L. Watkin, W. H. Harbottle, T. Bell (Assistant Inspector of Mines), W. Bryham, J. Bryham, J. E. Pearson, H. Mayhew, T. Southworth, J. Seddon, Lamb (Messrs. Lamb and Moore), W. Bryham, jun., Humble, and other gentlemen.

The healths of the Queen and the Prince and Princess of Wales and the rest of the Royal Family were given and duly honoured, the Chairman remarking that they were about to have an increase in the Royal family, and all would rejoice to welcome the new princess. (Hear, hear.)

The CHAIRMAN said the next toast was, at all events to the Wiganers present, the toast of the evening, and although they had expected a gentleman to preside who would have been able and willing to make a speech on the subject, he could himself, with the very best feeling, propose "Success to the South Staffordshire and East Worcestershire Institution of Mining Engineers." (Hear, hear, and applause.) He believed the Institution was comparatively a young one, that it had only been established about seven years, but he also believed that from the day of its birth it had kept growing until it had become a very prominent institution in the mining world. Time prevented him saying more, but he was sure the toast would be cordially received, and he begged to couple with it the name of Mr. Blakemore, the president. (Hear, hear, and cheers.) He (the Chairman) and his friends regretted that their time was so short, but they hoped that before long their visitors would come again. (Hear, hear.)—The toast having been drunk with enthusiasm, the PRESIDENT of the Institution responded. He said he was pleased to represent the Institution on that occasion, and he need scarcely tell his hearers the objects of their organisation. They were not joined together to help forward any trades union, or to adopt or support any policy obstructive to the carrying out of the Mines Regulation Act, however objectionable that Act might be; but they existed for the purpose of receiving and giving out practical and scientific knowledge in reference to mining. (Hear, hear.) They had come to Wigan that day something like a swarm of bees, and their Lancashire friends had given them an opportunity of sipping the nectar from various flowers that they had come in contact with, and he trusted they would return from this coal field carrying to their hive that amount of honey which would be conducive not only to their own good, but to the good of the community at large—(hear, hear)—and that they would return with larger thoughts and more expanded views than they previously had with regard to mining. He begged to thank them for that ready, unhesitating, generous way in which they had welcomed them that day. (Hear, hear, and cheers.) They had shown them their works, and their plans and sections, and had kept nothing back, but acted towards their visitors in a most generous and unselfish manner, and it was with the most hearty and unanimous feeling that the visitors returned their sincere thanks for the reception that had been accorded to them. (Hear, hear, and cheers.) He was sorry they had not much to offer them in their old and almost exhausted district (South Staffordshire), that they had not very much to tempt them to go over there. They could not show machinery superior or equal to what they had that day seen in this district, but if they would avail themselves of the opportunity to visit that district they might, perhaps, show them the remnants of one of the finest seams of coal that had ever been seen in the world, and, in addition to that, though it might not be profitable, it might be interesting for them to inspect the numerous faults they had there to contend with. **(Hear, hear, and laughter.) If at any time they should be disposed to visit South Staffordshire he could assure them they would give them the best and heartiest welcome they possibly could.** (Cheers.)

Mr. HENRY JOHNSON, ex-president of the institution, proposed "Success to the Lancashire and Cheshire Mining Association," an institution in which, he said, was involved, to a very great extent, the prosperity of the neighbourhood. They were often at a loss to tell why associations were formed, but in this instance he thought that, to some extent, the association was formed for self-protection and self-preservation, and there could be no harm in doing so, seeing that combinations took place on the other hand. The less necessity there was for associations of this description, however, the better, but there could be no doubt that one of this nature was never so much needed as at the present time, and he was sure the Lancashire and Cheshire Mining Association could only be established for purposes similar to their own in South Staffordshire—to keep the Legislature in the proper groove. He thought no one present would deny that, to some extent, the Legislature, with respect to mining enactments, had for the last year or two been running riot—(hear, hear)—and it was for such institutions as the one they were toasting to keep them right, not to serve trade purposes, or to keep up the price of coal, as was alleged, but to maintain the colliery operations of the district on a firm, proper, and honest basis. (Hear, hear.) He felt sure that, had it been left to men in the coal trade to bring forward measures, the enactments they had to submit to would have been very different indeed; but the present Acts had been brought about by men not conversant with the coal trade—maudlin philanthropists—and it was to their want of a knowledge of some of the difficulties apertaining to mining that they had got into such a muddle and mess in mining legislation. At the present time they scarcely knew what to do with regard to the inspection of mines. (A Voice: "What can you expect from Bruce?") He refrained from mentioning names, but he thought if members of Parliament would only take a colliery, and sink such a pit as they had that day seen, which was 806 yards deep, and where every provision was made for the safety of the men, they would be better able to legislate on the subject than at present. (Cheers.) There was in this district the Wigan Coal and Iron Company, whose works they had inspected during their visit, and who had two and a quarter millions of capital invested, and where such a large amount of capital was sunk it was necessary to watch legislative proceedings which affected the interests of the trade to the extent they found in modern times. He regretted that the president of the association (Mr. J. Knowles) was not present, and also that Mr. Maskell and W. Pearce were unable to attend. The latter gentleman's name was dear to them all, as mining engineers, who knew him in connection with the excellent treatise he had written on the Mines Regulation Act. (Hear, hear.) In conclusion, he begged to propose success to the Lancashire and Cheshire Mining Association, coupling with it the name of Mr. John Cross.

Mr. J. CROSS responded, regretting the absence of Mr. Peace, who would, he was sure, have adequately fulfilled the duty that had devolved upon him. He thought, with the last speaker, that the less such associations were needed the better, but there was now a great necessity for them, and they seemed to have a work to perform which could not be avoided in the present unsatisfactory state of mining legislation. (Hear, hear.)—The CHAIRMAN said a telegram had been received from Mr. J. Knowles, intimating his regret that he was unavoidably prevented from taking part in the proceedings.

Mr. SAMUEL SPRUCE, mining engineer, of Edghaston, gave "The Town and Trade of Wigan."—Mr. W. BRYHAM, in acknowledging the toast, said it gave them great pleasure to have met their Staffordshire friends, for meetings of that kind were conducive to good feeling, and he believed to the interest of the trade which they represented. (Hear, hear.) He had a very bright recollection of being in their distriet, and, notwithstanding what had been said, he could tell them there was a great deal to be learned in that district; he came back with increased knowledge, and he had no doubt he would return with still more knowledge if he went again. (Hear, hear.) He begged to thank the visitors for their kind expression of satisfaction with the way in which they had been received, and hoped they would ever find it the same if they came to Wigan.

Mr. WATKIN gave the health of the secretary, Mr. Henry Johnson, jun., mainly owing to whose admirable arrangements the visits to the various collieries were carried out so successfully.—The SECRETARY responded.

On the motion of Mr. JOHNSON, sen., votes of thanks, with hearty cheers, were accorded to the Chairman and to the proprietors and colliery managers of the district, after which the company separated, the members of the Institution returning to the London and North Western Station, and leaving for Dudley at 5·25, evidently much pleased with their visit.

INTERESTING EXPERIMENTS WITH DYNAMITE.—Some very interesting experiments with Dynamite were made, on Wednesday, at the Bloomfield Marl Hole, belonging to Mr. James Whitehouse. There were present a number of gentlemen and workmen, who had come some distance to watch the proceedings, and amongst them we noticed Mr. James Ritson, mining engineer, Gornal; Mr. Thos. Roper, mining engineer to the Barbor's Field Colliery Company, Mr. Benjamen Dunkey, Mr. T. Jackson, and many of the sinkers and workmen from the adjoining collieries. Mr. Thomas Johnson, of the firm of Johnson and Co., Trindle-road Dudley, conducted the experiments. In the Bloomfield Marl Hole many huge pieces of rock or boulders are constantly to be met with. Some of them are of enormous size, measuring as much as 3 yards square, and it was to these massive pieces of rock that the attention of the dynamite was called. When these boulders are met with in the marl they are got out and generally put on one side until they become obstacles in the way of the workmen. Consequently they have to break them up, by the aid of powder, into small pieces, so that they may be carried out of the road. In breaking of these large boulders or pieces of rock with powder, a hole has to be bored in the centre of the boulder, and then charged with powder. The shot does some times take proper effect, but at the best of times only splits it up into two or three pieces. These pieces in their turn have to be bored, or, as the workmen call it, "fopped," and each separate piece has to be charged again. The consequence is that with patience they get broken, but very often they have to be fopped again and again, as some of the pieces are even then too large to be conveniently handled. The first boulder that was experimented upon was a piece of hard, grizzly rock, measuring 7 ft. square. A hole was bored in the centre, about 12 in. deep; two small dynamite cartridges, ¾ in. diameter by 3 in. long, were placed in the hole. The hole was filled with water, the fuse lighted. In a few moments the shot went off, and, to the astonishment of those assembled, the piece of grizzly rock was smashed into hundreds of pieces. It was broken so well that fopping was not required. The next piece of rock was equally as large as the first, but more the shape of an an oyster. The hole was bored in the centre on the flat side, about 10 in. deep, and two cartridges were dropped into the hole and fired, the result being that the piece of rock was shattered to pieces. The next experiment was trying the dynamite in the clay and rock combined in a solid face of work. The hole was bored in from 6 to 8 in; two small cartridges were then placed in the hole, and rammed up with clay. The shot went off, and brought a large quantity of clay and rock with it, besides loosening the face and cracking the the top in all directions, 3 and 4 ft. each way. The next experiment was to place a single cartridge, ¾ in. diameter by 3 in. long, on a piece of very hard rock, 3 ft. 6 in. square, specially chosen for the trial by Mr. James Ritson. The cartridge was only held in its place by the aid of clay. The shot was fired and the stone broken to pieces; one piece, a few pounds weight, was sent into the air some 100 ft. and dropped on topped of the Marl Hole. This experiment was highly satisfactory to those who were present. The piece of rock, 3 ft. 6 in. square, was blown by one single cartridge into that state that it has the appearance of having been purposely broken with a hammer. The last experiment was by firing two shots together in two boulders, one cartridge in each. The result was that they were blown into cobbles. This finishing the whole of the day's experiment. Mr. Ritson, on behalf of those present, said they were perfectly satisfied with the dynamite, and the efficient manner it had done its work.

THE WASSELL GROVE COAL ESTATE.—This property, situate in the parishes of Hagley, Hales Owen, Pedmore, and township of Luttley, Worcestershire, was offered for sale at the Hen and Chickens Hotel. Mr. GIBSON (of the firm of Chesshire and Gibson) was the auctioneer. After reading the particulars and conditions of sale, Mr. Gibson quoted the opinions of Mr. S. B. Blackwell, of Dudley, in June, 1863; Mr. Nelson Boyd, C.E., in September, 1872; and Mr. Wm. Y. Craig, of Harecastle Collieries, Stoke-upon-Trent, as to the value of the coal proved on the estate.

Mr. Craig's report was as follows:—"In the month of January, 1862, I was requested by Mr. George Elliot, M.P., to make a careful survey and examination of the strata in the district of Wassell Grove, and advise him upon the desirability of continuing the boring, which had at that time reached a depth of 60 fms., without disclosing any satisfactory strata; and there having been spread abroad an opinion that the coal was not within 600 yards of the surface, the stoppage of the boring had been all but decided upon. I made this inspection, and after a careful inspection of the workings of the adjoining colliery, and a minute inquiry into the nature and extent of the workings and strata towards Wassell Grove, I arrived at the conclusion that the district between those collieries and the bore-hole in Wassell Grove was comparatively free from faults, and that the bore-hole was not far from the two-feet coal overlying the brooch coal, and I advised the continuation of the boring. The bore-hole was put down accordingly, and the two-feet coal was met with at a depth of 73 fms. I saw the coal bored through, which was 2 ft. 9 in. thick; this coal was bored through on Feb. 12, 1862, and the measure being of a very distinct character, and known to overlie throughout the district the brooch and thick coal, it was considered unnecessary to proceed further with the bore-hole, which was stopped. Mr. Elliot contemplated the opening of the mines of the estate, and before sinking he deemed it advisable to prove the brooch and thick coal, and the boring was resumed on April 8, 1862, by Mr. George Stott, under my inspection; and at 79 fms. the brooch coal was met with, and I also saw this bored through, which was 4 ft. 2 in. thick. The hole was continued to a depth of 95 fms. 4 ft. 8 in., and was finally stopped at that depth on Sept. 16, 1862. At 87 fms. 4 ft. 6 in. the roof of the thick coal was met with, which consisted of dark grey shale and ironstone bands, and the thick coal measure was bored through under my supervision, and proved to be 37 ft. thick, mixed with soft shale bands. I examined the contents of every draw of the bore rods in passing through this measure, and can testify that it contained 19 ft. 6 in. of coal. Under this a bed of fire-clay was pierced; and there are other valuable beds of fire-clay and ironstone in the section. I was of opinion that the coal and other marketable matter proved by this bore hole justified the expectation that a colliery, if established to work those proved measures, would be a remunerative one. I made a most careful inspection of the section subsequently sunk through in another part of the estate, and after comparing this section with that of the bore-hole, I was of opinion that the thick coal proved in the bore-hole was considerably below the depth at which the pits were stopped, and the downthrow fault proved in the drift driven from the shaft, in my opinion, sufficiently accounted for the increased depth of those measures; and I entertain no doubt that the expectations raised by the result of the bore-hole would be realised if a pit was sunk in that district for the working of the coal and fire-clay, the value of which is considerably enhanced since they were proved."

Mr. George Elliot, M.P. for North Durham, wrote:—"I have read Mr. Craig's report on the Wassell Grove coal field, and I confirm its accuracy." Colonel Richards and Mr. Effingham Wilson, one of his trustees, together with Mr. Shum, of the London firm of Shum and Copman, solicitors, and Mr. Roweliffe, from Messrs. Roweliffe, solicitors, were present. Mr. Gibson stated that, after the reception of the reports, the vendors had formed a different opinion as to the value of the property to that which they had previously entertained. They had come to the conclusion, owing to negociations that had commenced since the late reports were received, to ask a reserved price of 100,000*l*. Some small outlying places in villages of Hagley and Pedmore were then put up, and realised very good prices.—*Birmingham Gazette.*

LONDON GENERAL OMNIBUS COMPANY.—**Traffic returns for the week ending Aug. 10, 11,316*l*. 12s. 3d.**

AUTOMATIC GAS STOKING APPARATUS.

Although at the present season we are less dependent upon artificial illumination than we shall be a few months hence, it behoves us, considering the inconvenience experienced last year through the refractory proceedings of the gas-stokers, to take the necessary steps to render the recurrence of a similar strike of little consequence, if not altogether impracticable, and the adoption of a reliable automatic gas-stoking apparatus is, perhaps, the first matter to which gas-producers should turn their attention. Such an apparatus has been designed and patented by Mr. Thomas F. Rowland, M.E., of Brooklyn, New York, and from the smoothness and continuity of motion observable in the working model which the inventor has now in operation, no doubt can be entertained that when applied in our gasworks it will prove a practical success. The model in question is accurately made to scale, is one-twelfth the size of the machinery which would be required in the gasworks, and appears to leave nothing to be desired either in simplicity or efficiency. The arrangements for regulating are complete, but, from the very principle of the machinery, the fact of the coal being supplied too fast cannot lead to any inconvenience or injury to the stoking portion of the apparatus, the sole difference being that the machinery performs a little useless work. One set of machinery, which can be readily operated by three men, can do the work of fully 50 practised gas-stokers, and from the manner in which the work is done the gasmaking process will certainly be facilitated, and the coke will be obtained in the best possible condition.

The apparatus consists essentially of a series of self-loading and self-discharging buckets, which travel on an endless railway, and supply a set of automatic stokers which pass up and down upon a suitable tramway in front of the retorts. As to the details, they will not be difficult to explain if the ordinary process of gas manufacture be kept in mind. The antiquated system of shovelling in the coal at random has given place in most of the best-conducted works to the method of charging with a scoop the length of the retort, the obvious advantage being that the coal, being more regularly deposited in the retort, is more regularly distilled, and the maximum quantity of gas extracted. It has been customary hitherto to load these long scoops with half a retort charge before the drawing of the previous charge, the object, of course, being to keep the retorts open for discharging and recharging the shortest possible time. In the hands of careful stokers this system worked admirably, but any carelessness, either in filling the scoop or in manipulating the hand-rakes for drawing the coke, led to banking up and choking, involving not only considerable delay, but much loss of heat also. Recognising the inconvenience attending this system of working, inventors have long sought to replace the manual labour by machinery, and enough has been done to demonstrate that the mechanical charging and discharging of gas retorts presents no real practical difficulty. To an extremely simple system of charging and discharging the retorts Mr. Thomas F. Rowland adds automatic arrangements for bringing the coal into the retort-house and for delivering a definite quantity into each charging-scoop, the result being an even deposit of coal on the floor of the retort in the shortest possible time after the door is opened, an equally simple arrangement being used for the withdrawal of the coke of the previous charge.

The "Pendant Railway Coal Carrier," by which the coal is carried from the storehouse to the retorts, consists of an endless rail secured underneath and to the tie-rods of the roof frame of the retort-house, or to beams mounted on columns to receive them, such rail forming two lines of way 10 ft. apart, and connected by semicircles 5 ft. radius. The belt which serves to haul the buckets attached to it, and mounted on suitable carriages, is passed round two drums, one near the coal store being driven by a steam-engine, and giving motion both to the coal-carrier and to the elevator, which will be presently mentioned, whilst the other within the retort-house is used merely as a guide. The driving-drum is also made to do duty in filling the buckets with coal, for which object it is provided with diagonal chutes, through which at each half revolution of the drum one charge of coal is permitted to pass from the hopper above into one of the buckets. As the loaded buckets pass down the retort-house they run over the hopper of the scoop-charging apparatus, upon which is a tripper to release the trip-latch at the bottom of the bucket and drop the coal. Each pendant bucket holds about 300 lbs., and they are made to travel at about 100 ft. per minute; if, therefore, they are about 15 ft. 6 in. apart they will carry about 50 tons an hour, but of course the variation of quantity is a mere matter of detail. Should the hopper above the scoop-charging apparatus become full more quickly than is required for keeping the retorts charged the tripper removes itself, and the loaded bucket passes on until it arrives at a fixed tripper at the coal store, when it drops the coal and takes in a fresh charge as before. The elevator which supplies the hopper above the driving-drum is simply an endless chain of buckets to which the drum gives motion.

Turning to the stoking apparatus proper, the arrangements are equally simple and efficient. The carriage, which is arranged to run on a suitable railway from end to end, the retort-house carries both the charging apparatus and the "coal metre." This metre is connected with the hopper already mentioned as receiving the coal brought in from the coal store, and consists of a horizontal cylinder divided longtitudinally into as many chambers as there are retorts to charge at one operation. Each division is in turn filled with coal from the hopper, and subsequently discharged into its corresponding scoop. The edges of the openings both of the cylinder and hopper are armed with steel blades, which act as shears to cut away any coal which might otherwise tend to clog the revolving cylinder. This charging portion of the apparatus consists of a traversing carriaged mounted on wheels to move upon rails on the main truck. This carriage is provided with scoops placed one above the other at distances corresponding to the vertical measure between the retorts. The scoops are in sectional form, similar to the shape of the retorts, and are provided with movable bottoms, arranged to be drawn by means of racks and pinions. When the scoops are filled with coal from the metre the carriage is thrust forward, and while the scoops are within the retorts the bottoms are withdrawn, thus allowing the coal to fall in even layers on the retort floor. The coal is prevented from coming back with the scoop bottoms by means of cross partitions at intervals riveted into the scoops. The sliding bottoms replace themselves by the drawing back of the scoops. The coke rakes are worked to and fro by a similar arrangement, but there is an ingenious contrivance for carrying the rakes above the coke whilst they are passing into the retort. The motive-power for running the rakes in and out of the retorts is so arranged that it is impossible to injure or withdraw the retorts from the bench setting.

The platforms upon which the workmen stand to manipulate the machine, are secured to the traversing machine, and travel with them, and as the steam and exhaust connections between the engine and boiler are made flexible, one machine commands the entire retort-house, and the inconvenience of carrying the boiler upon the truck is avoided. For large gasworks the entire apparatus will prove a source of enormous economy, as well as removing the difficulty of dealing with the labour question; whilst the first cost of the machinery complete, and the amount of expenditure that would be required for wear and tear and repairs, are so small that it could be advantageously adopted whenever the production exceeds 500 thousands of cubic feet of gas per day. The invention certainly promises to be alike profitable to the inventor and to those who adopt it.

NEW STEAM-ENGINE.—A small motor, suitable for sewing machines, has been invented by Frederick Siemens, in Dresden. It is described as a steam-engine which has neither cylinder, or piston, or guide bars, or crank, or valves, but only a boiler, which is at the same time the moving part. The machine works always with one and the same quantity of water. The steam passes through a cycle something like what is seen in nature; the sun evaporates water on the earth's surface; in the upper strata this again becomes liquid, and returning to the earth does a large amount of mechanical work. The machine is 0·1 horse-power, needs little attention, and is quite safe, the tension of the steam being below. It is heated by gas it consumes 25 cubic metres per hour. The cylinder shaped boiler is expanded conically at the upper part. It stands at an angle of 45°, and turns on supports, while a beveled wheel arbour changes the motion into a horizontal or a vertical. **It can be seen in action at the Vienna Exhibition.**

Meetings of Public Companies.

MINERA MINING COMPANY.

At the annual general meeting of shareholders, held at the offices on the works, on August 1 (Mr. KAY, the Chairman of the board of directors, presiding), a dividend was declared of 8s. per share, free of income tax, making, with the three quarterly payments on account, 38s. per 5*l.* share, free of income tax, equal to 38 per cent. per annum on the share capital of the company.

SOUTH CARADON MINING COMPANY.

At a general meeting of shareholders, held at the mine, on Tuesday (Mr. THOS. KITTO in the chair)), the accounts for March, April, and May showed a profit of 1289*l.* 1s. 5d. A dividend of 2*l.* 10s. per share was declared, and the balance of 318*l.* 17s. 10d. carried to the credit of next account. The following report was read:—

Aug. 12.—I am pleased in being able to report that the mine continues to return the usual quantity of ores, of just the same quality, and, on the whole, it is looking much as usual; but, in consequence of the very low price of copper, which has so considerably decreased in value since our last meeting, together with the high price of coals and other materials, I am sorry to find we are not able to pay so large a dividend as we could desire. We still, however, are hoping that the market will improve, when we shall be enabled to make a much greater profit.—J. HOLMAN.

WEST TANKERVILLE MINING COMPANY.

The annual general meeting of shareholders was held on the mine on Aug. 7, Mr. WILLIAM GREAME in the chair.

The LONDON MANAGER read the notice convening the meeting.

The report of the directors stated that it is with pleasure that they again meet the shareholders, as they feel they can state with confidence that the mine is at last about to commence a prosperous career. The report of Capt. Waters gives full details, and states that monthly sales of ore will begin next month, with the prospect of increase; and he says that "we shall soon be able to speak of considerable returns, with fair dividends to the company." With regard to the finances, the directors are at present of opinion that no further capital will be required from the shareholders.

The report of the manager was as follows:—

Aug. 6.—In reporting on the mine for the general meeting to-morrow, it would be a source of pleasure to me could I speak of large returns and corresponding profits gotten and divided amongst the shareholders in the year now past. But as this cannot be so, and as you come here to hold your annual meeting, to see for yourselves and ask the reason why West Tankerville does not appear in the dividend list, and has not kept pace with her neighbours, I will forthwith apply myself to the task of satisfying your reasonable curiosity in the matter. The Wood lode, Cornish lode, and California lodes have been wrought extensively from surface to various depths below the adit level, by previous companies, with results, taken collectively, which exceeded in quantity the yield of ore from either the Roman Gravels or Tankerville Mines, at corresponding depths from surface. When you commenced operations the workings on the lodes in question were under water, and your agents had no means of reporting on the various points from actual observation, or facts within their own knowledge. They were guided by what the old miners said of the mines, and from a knowledge of the history of other mines in the district, which, like this mine itself, have had to pass through years of unsuccessful existence, previous to coming upon runs of ore now so remunerative to the fortunate proprietors.

We could not, I say, go down into the workings in question and make selections as to which lode should or should not be first attacked. There was no option but to erect machinery, drain the lodes, and take the chance of pursuing the right course in the case. We were very successful in draining the parts of the mine referred to, and although our predecessors left no great riches in sight, and notwithstanding our being unsuccessful in searching for runs of ore on those lodes hitherto, we still have the greatest confidence in eventually finding courses of ore which will make amends for all the patience you have exercised in respect thereto. The runs of ore in anticipation will be found in connection with the south shale, and as neither of the levels under consideration has yet been driven up to the points corresponding to those where the south runs of lead were met with in Roman Gravels, and at our own South Boundary shaft, we still think that by further driving on the Wood and Cornish lodes in particular will lead to the results anticipated.

South Boundary Shaft.—This part of the mine, different from the preceding parts, was open to inspection, and the various productive points well known to us from the beginning. It was an ascertained fact that the group of lodes known in Roman Gravels by the names of Lawrence's No. 1 caunter, No. 2 caunter, and the east lode, all come from that mine into West Tankerville at the south boundary shaft. Each of the veins of the group is remuneratively productive, and now that the said shaft (which has been in course of sinking for the last three years) is completed to the 44 fm. level, or 82 fathoms from surface, and the whole of the lodes cut into at the 6, 20, 35, and 44 fm. levels, and rich courses of ore made available for stoping, we shall soon be able to speak of considerable returns, with fair dividends to the company. There is a great length of rich ore ground on No. 1 caunter that will, we think, itself pay the cost of the mine, and give profits to the company. The 44, south of shaft, is worth 5 tons, and 44 north 4 tons of lead ore per fathom. No. 1 stope, in the roof of said level, will be worked by six men, at about 5*l.* 10s. per fathom in a lode worth 4 tons per fathom. No. 2 stope, south of ditto, by six men, in a lode also worth 4 tons per fathom. Then we have the new lode to work upon in the different levels from which fair returns will be made. The No. 2 caunter and the east lode, too, are both strong, and show indications of great productiveness. In three weeks from now we shall be sinking the shaft below the 44, on Lawrence's lode, which is worth 1 ton of lead ore per fathom We calculate to have 8 fathoms to get to the 50 (driven into West Tankerville from the Roman Gravels Mine) and into a course of ore worth 5 tons per fathom. By the end of the same period we shall be in full swing, winding out of the whole of the levels from the 44 to the 6, with the stopes and ends on the caunter in full work. We expect to commence sampling 30 tons of lead ore forthwith from south boundary alone, and with the present fine appearance of the Cornish lode in a winze being sunk below the 10 fm. level, we hope shortly to increase to 40 tons per month.—ARTHUR WATERS.

The CHAIRMAN said—You have just heard Capt. Waters' report of the present position and future prospects of the mine, and I think I may now fairly say that all or most of the difficulties we have had to contend against are vanished. You will, perhaps, recollect that at our last meeting I stated that sinking on the south boundary shaft must be considered more as a certainty than a chance or mining speculation, as by the courtesy of our neighbours, the Roman Gravels Company, we were enabled to verify the existence of a rich course of ore at the 50, worth 5 tons per fathom. The shaft is now down to the 44 fm. level, 84 fms. from surface, and a level driven out to this rich lode, so that we have nothing to do but, as may be figuratively expressed, put out our hands and seize the riches within our grasp; and I am glad to say that not only this lode, the existence of which was previously known, but two more have been met with in sinking the shaft—one to the north and the other a little to the south of this lode, both of which have been seen and worked on at the 50, and it appears more than probable from recent diallings that the first of these lodes is the same as worked in the Roman Gravels at the 65 and 80, called the east lode, and worth there 2 to 4 tons per fathom. On the other part of your sett—the Wood, Cornish, and California lodes—we have not been doing much lately, as they have been somewhat neglected in order to push on the important work at the boundary shaft, but I should not recommend that all the profits from the boundary lodes should be paid away in dividends, without reserving some portion to more fully develope these points, particularly the Cornish and California lodes. You will have observed that the shaft is only down 84 fms., whilst at the Tankerville they have sunk 170 fms. in the same time; this is, however, easily explained—the surface water was so quick in the shaft that we were obliged to suspend the sinking until an adit level, which has been driven 90 fms., was up to the shaft; this has now effectually drained the shaft, and the whole work does great credit to Capt. Waters for laying it out, and Capt. Andrews for so efficiently carrying out his suggestions.——Mr. J. J. PYNE seconded the proposition.

Mr. HOWLAND enquired how far the boundary shaft was from the shale?——Capt. WATERS, speaking from memory, thought it was about 20 fms. He considered those lodes were permanent, having been worked from the surface to the 50 in Roman Gravels, the drivages in the latter being up to the West Tankerville boundary.

Mr. HOWLAND asked if the old engine was being worked to drain the Californian part?——Capt. WATERS said it was used to keep the California and Cornish lodes drained. The engine was not worked at night, but it would be advantageous if only to obtain the water for dressing.

Mr. HOWLAND said the mine was started to prove the Wood vein. He enquired if it were intended to prove that mine in depth? He had heard that at the 60 a cross-cut had been driven out, and that by sinking a winze some 7 fms. a junction of the lodes might be expected to be reached.——Capt. WATERS said it was his opinion that it would be unwise to think of sinking on the Wood vein until a discovery had been made in the south part of the mine. The first run of ore the Lawrence's had was cut out by driving down to the greenstone and the shale. They wanted to drive to find another run of ore; and his opinion was that if it were met with it would be south, and not in depth.

The CHAIRMAN said they had a similar thing in the 50, where a discovery was made up to the south end against the shale. As to the rumour in London that more capital would be required, so far from that being the case, they had capital represented in the mine, and would be turned into capital in due course.

Mr. HOWLAND said there could not possibly be anything more satisfactory to the shareholders.

The CHAIRMAN said that when the mine was in a remunerative position—which would now soon be the case—it would be proposed to divide the profits in dividends and developing the old part of the mine.

Mr. MURCHISON, in reply to a question, stated that the cost had averaged about 350*l.* per month.

Mr. ALFRED COOKE asked whether the first return of 30 tons would be made next month?——Capt. WATERS said they would not be able to return 30 tons next month, because it would take three weeks to get the shaft in perfect order.

The CHAIRMAN said there were stopes that could be opened at once, yielding 4 tons per fm., and the level 5 tons—these were independent of what they will be able to do when the cross-cut was put out that would pay the whole costs of the mine.——Mr. GREENSILL had understood the assets had been reduced since the balance-sheet was made up.——Mr. MURCHISON said that nearly 400*l.* worth of ore had been sold since the balance-sheet was made up.

Mr. GREENSILL asked if the directors were perfectly confident further capital would not be required?——The CHAIRMAN: Most certainly. The directors believed no more capital would be required.——Capt. WATERS said that by sinking below the 50 a new section of the mine would be opened up.

The CHAIRMAN said they were all very much indebted to Capt. Waters and Capt. Andrews for the energy and ability displayed in bringing the mine into its present satisfactory position.

The report and balance-sheet were received and adopted unanimously.

Mr. STANDRING had much pleasure in proposing the re-election of Mr. J. J. Pyne, the retiring director. It was very desirable the present board should be kept intact, and he hoped each member would live to participate in the prosperity indicated by Capt. Waters.——Mr. GREENSILL seconded the proposition, which was put and carried unanimously.

Mr. PYNE acknowledged the vote, and congratulated the shareholders upon the favourable position and prospects of the mine. He could assure the meeting that everything had been done both by the board and Capt. Waters and Capt. Andrews to facilitate the completion of the South Boundary shaft, and now that had been accomplished there could be no doubt the whole costs of the mine would be fully met by the returns from that part of the mine alone.

Upon the proposition of Mr. HOWLAND, seconded by Mr. PYNE, the auditors were re-elected, with a remuneration of 10 guineas.

Upon the proposition of Mr. GREENSILL, seconded by Mr. HOWLAND, a cordial vote of thanks was passed to the Chairman and directors for the energy displayed in bringing the mine into its present successful issue.

A vote of thanks was passed to Capt. Waters and Capt. Andrews.

The usual courtesies to the Chairman closed the proceedings.

OLD BATHOLES MINING COMPANY.

A general meeting of shareholders was held on the mine on Aug. 7, Mr. W. GREAME in the chair.

The LONDON MANAGER read the notice convening the meeting.

The report of the directors stated that the progress made in the works is favourable, and that productive ground will soon be available. The directors believe that moderate time only is required to make this property a remunerative one. The costs are comparatively light, and the directors consider that the balance in hand will be ample to develope the important parts in the mine.

The report of the manager stated that from surface to the upper and deep adit, from thence down through all of the levels to the 48, rich ore deposits were met with, thousands of tons of lead ore sent to market, and profits made to the shareholders. Our position is now one of the most favourable, for we have just cut into the great lode, and have drained the old men's workings, in which we are sinking a winze below the 48 in the ore ground. The said winze is down 5½ fathoms, and have 6 fathoms more to communicate with the 60, which will be accomplished in two months time. The winze through, we shall have stopes immediately available of 24 fathoms in length in ground that will stope at 2*l.* per fathom, in a lode worth 1 ton per fathom. No doubt, sampling will be commenced in the course of the next four months. By the next annual meeting we hope to prove the mine to be of considerable worth and profit to the company.

The CHAIRMAN said he could not add anything to what had been reported by Capt. Waters, except to say that every economy had been exercised compatible with energy and efficiency. The driving of these old levels had been a tedious operation, and now that the spar lode had been struck they expected soon to be able to reach ground that would pay for stoping. He was sure there was no want of energy on the part of the management. He hoped that when they met again they would have something still more favourable to report, and in the meantime there was sufficient money in hand to meet all the expenses. He moved that the report and balance-sheet be received and adopted.—Mr. YORK seconded the proposition.

Mr. HOWLAND said that last year the lode in the 50 fm. level was reported as worth 5 to 6 tons per fathom.

Capt. WATERS said that part of the mine had been abandoned, and they were now working the Hope Valley portion, where they expect to make a discovery. The previous workers raised some thousands of tons of ore, and according to the old plans they must have had rich courses of ore.

Mr. YELLAND said that from 40 to 50 tons per month were raised for some considerable time. There were splendid bunches of ore; and in his time, from the 48 fm. level, immense quantities of ore had been raised. Before that the returns had been even much larger.

Capt. WATERS said they were now in a fair position to prove the ground under the old men's workings.

The report and balance-sheet were received and adopted.

Upon the proposition of Mr. J. J. PYNE, seconded by Mr. YORK, the re-election of Mr. W. C Buller as auditor was unanimously agreed to.

A vote of thanks was passed to the manager, and also to the Chairman and directors, which concluded the proceedings.

ST. STEPHEN'S TIN AND COPPER MINING COMPANY.

The statutory meeting of shareholders was held at the offices, Crosby House, on Tuesday,—Lieut.-Colonel FLUDYER in the chair.

Mr. W. WARD (secretary) read the notice convening the meeting.

The CHAIRMAN said: This meeting is called in compliance with the Joint-Stock Companies Act (*i.e.*, within four months after the date of the registration of the company). There is, of course, no such thing as a financial statement to lay before you, but there are several matters of considerable interest to you as shareholders that I have great satisfaction in communicating to you. It is my duty to tell you, in the first place, that although the company has had as yet but a brief existence, very considerable progress has been made in every department, as I will show you. Our solicitor has reported to the board that the whole of the property comprised in the four setts—Dowgas, Dowgas Tenement, Strawberry, and Orchard—are now legally vested in the company, and our agent has been in possession since the date of the registration of the company. That agent is Capt. John Nicholls, of Truro (who has been connected with these properties under the late proprietors from August, 1871), and I feel fully justified in stating that he thoroughly understands the task he has in hand, and you may rest assured that in him the company has secured the services of a most intelligent and energetic mining agent. He is most ably assisted in his various duties by Capt. Job, a mining agent of great experience. With regard to the company's prospects, I will venture a few remarks. We have gone on the safe principle of ascertaining for certain that we have a great quantity of tin ore before investing large sums of money on machinery. You have all of you seen the prospects, and I may add to the statements therein contained that I have on two occasions spent considerable time on the property, on the last occasion 10 days; that I have been several times underground, and have seen the large lodes now laid open. I am glad to see a gentleman present (Mr. Lynch) who is experienced in these matters, and whose report I will now read, and I shall ask him to tell you what his opinion of our property is. With regard to the lode in Strawberry, which Mr. Lynch will describe to you better than I can, there can be no doubt that there is tin ore enough opened out there to last for a length of time. Besides this lode cross-cuts are being driven to intersect others. Having a certained for certain that we have no lack of rich ore, it became the duty of the directors to purchase suitable machinery for our operations. This has been promptly, and I trust you will consider well, and at the same time economically done, and I have to report to you that we now have bought and paid for a 50-in. pumping engine and two 10-ton boilers, a 24-in. double-acting rotary engine, with two fly wheels, double cranks, &c., and two 10 ton boilers, 48 stamps, each head and lifter weighing 812 lbs., a very powerful crusher or stone-breaker, 65 fms. of 12-in. pitwork, and a very large amount of mine materials of all kinds, with whims, &c. Buildings of all kinds and dressing-floors are in a forward state. The working shafts are being rapidly enlarged and timbered, and the underground works are being pushed on with all possible expedition. All matters are, in fact, progressing most satisfactorily, and we hope to begin stamping by Nov. 1, in which case I believe you will see a considerable sum realised from the sales of tin by Jan. 1, 1874. In conclusion, I am happy to say that our financial position is most excellent and perfectly safe, and when we have the pleasure of meeting you again I feel assured that we shall have very substantial reasons for mutual congratulations.

The following report was read:—

July 25.—This property is too well known to you, both as regards its position and extent of boundary, for me to add a word of explanation, and I need only refer your shareholders to a perusal of the prospectus of the company, which I carefully examined previous to my visiting the property the second time, and I do not hesitate to endorse the reports therein, and to add that the property will ere long show such an immense amount of wealth as to astonish the public. The lodes in the different mines—*i.e.*, Wheal Orchard, Wheal Strawberry, Great Dowgas, and Dowgas Tenement—are far more productive for tinstone than is represented in the prospectus. The middle lode in the Strawberry Mine is full 20 ft. wide, where rocks of tin may be broken at any point in the end of wonderful richness. During my casual examination of the various operations going forward at surface I was struck with astonishment to perceive the great progress which had been made since this time last year, when there was not a spark of life apparent at either of those mines, while at present all is a comparative beehive, various buildings restored, engine-house covered in, and quantities of machinery on the spot. In short, the progress made towards a vigorous start to develope this most valuable property is marvellous, and shows that there are keen eyes directed towards the management of the affairs of the St. Stephen's Mines. It is needless to say that such energetic labours must soon show good results, which will be the more easily effected inasmuch as there are ample rich materials to work upon.—J. J. LYNCH.

Mr. W. WARD said he had also visited the mine upon three different occasions, and fully endorsed all that the Chairman had said as to its merits and value. Everything was pushed vigorously forward both underground and at surface. At the 50, in Strawberry, he found a magnificent course of ore, measuring 20 ft. 4 in. wide, containing some of the richest tin in Cornwall, and very pure in character. He questioned the miners, and found that the old company had failed from the fact that when the lode had taken a "horse" the left branch was followed, but Capt. Nicholls went back and took up the other branch, which had led to the discovery of this mass of ore. The miners added that had this discovery been made earlier the present company would never have possessed the mine. Looking over the surface he found strong indications that an enormous amount of ore had been extracted from the mine at some former period. It was no doubt one of the best pieces of tin ground in that part of the county. Everyone in the locality spoke very highly of it, and had no doubt as to ultimate results provided sufficient stamping power was erected to reduce the tinstuff as it was extracted. He found a large number of men at work, and everything progressing energetically, and with every economy compatible with efficiency. He knew that in Capt. Nicholls they had a man of energy and ability, and as soon as the stamps shall have been erected, the buildings for which were in a forward state, it was proposed to work the stamps night and day, and if vigorously worked each stamp would crush 1 ton of ore per day. All he could do was to congratulate the shareholders upon possessing such a property.

Mr. LYNCH confirmed all that had been said about this mine both as to its value and capabilities. The casing of the shaft had been carefully and completely done, and in a substantial manner, and would last for many years. He did not think Capt. Nicholls was likely to live to see the whole of the tinstuff taken out of the mine.

The CHAIRMAN read a letter just received from the mine, stating that the 20 fm. level cross-cut had reached the lode, but the agent would not be able to give an idea as to its value in less than a week—it was so large and hard that it would take that time to get through it.

Mr. LEONARD WRAY (a director) said that a gentleman, totally unconnected with the mine, came in the office this morning, who stated that he had received information of a very great discovery in Strawberry. Having referred to the lamented death of Dr. Taylor, a member of the board, he stated the directors did not think it desirable, at any rate for the present, to fill up the vacancy. The board, he added, had resolved not to take any fees until the mine had commenced to pay dividends. Each director had so large a stake in the company that they had determined not to spend any money except in the development of the mine. Their Chairman deserves the most especial thanks of the shareholders, for he had devoted his time—which is very valuable—in twice visiting the mine, and on the last occasion spent 10 days in going underground—it could not fail to be satisfactory to the shareholders to find that gentleman who held such a large stake in the company took such a personal interest in seeing that every detail was being carried out in a satisfactory manner. At present, operations were confined to Strawberry, in which there was an immense amount of ore ground laid open, the extent of which it was impossible to calculate. Above the adit there was enough stuff to keep any number of stamps in constant operation for a long time. It was the opinion of Capt. Nicholls that there is an enormous lode standing whole up to surface, and it is only reasonably probable that it increases in richness and size in depth. But this is only one of the lodes—there is besides a great south lode, of about 16 ft. wide, and a north lode of 6 ft. wide, and others. Capt. Nicholls thinks that these lodes will form a junction in depth, in which case the amount of ore they will be able to extract exceeds anything he should like even to venture to indicate.

Mr. WADDINGTON asked the value of the lode?——Mr. LYNCH said that to carry about 86 ft. of it would be worth from 70*l.* to 80*l.* per fathom.

The CHAIRMAN, in reply to a question, stated that the balance in hand was 2900*l.*, besides 12,000*l.* of uncalled capital.

A unanimous vote of thanks was passed to the Chairman for his personal attention to the interests of the company.

The CHAIRMAN acknowledged the vote, which concluded the proceedings.

EXCHEQUER GOLD AND SILVER MINING COMPANY.

The annual meeting of the shareholders was held at the offices of the company, Palmerston-buildings, on Tuesday,

The Right Hon. the Earl POULETT in the chair.

Capt. CHALMERS (the secretary) read the notice convening the meeting.

It was moved by the CHAIRMAN (Earl Poulett), seconded by General CAMPBELL, and carried unanimously, that the report and balance-sheet as printed and sent to the shareholders be taken as read, and adopted.

Mr. KINGSFORD enquired how long the mill ran after it commenced on June 30?

The CHAIRMAN replied six or seven hours, and then read the manager's letter of July 8 explanatory of the stoppage, which he attributed to a want of capacity in the boiler to produce steam sufficient for the purposes required. This boiler had been since then replaced by another of greater capacity. Mr. Fountain, the celebrated mill engineer, had recommended Mr. Chalmers to try the boiler before replacing by a new one, in order to ascertain if it was sufficient for the purpose. This advice had proved unfortunate, because it involved a month or six weeks' delay in the production of bullion, and during that time money had to be expended for the men's wages. Had Mr. Chalmers been left to himself he would have put in a new boiler, and thus effected a considerable saving of time and money. A telegram had been received from the manager on Aug. 1 that he was "cross-cutting to the ledge, and that the new boiler was half set;" consequently the anticipation was that he could begin in the first week in August to turn out bullion. The directors having entire confidence in the mine and manager, had themselves advanced the money required without troubling the shareholders in the matter, and could find more if it was necessary, being determined, as far as in them lay, to make this company a remunerative one to all concerned.

A SHAREHOLDER asked how many tons of ore there were at the mill?——Mr. SYME said about 300 tons, which, however, was not expected to turn out very rich, but that as soon as the manager got to his lode, to which he was now drifting from the 100—and he was about 17 ft. from it by last accounts—he hoped to be able to supply the mill with ore of a much higher grade. Water and timber being procurable free of cost in any quantity on the company's property of nearly two square miles, the actual cost of mining, hauling, and reduction would not, it was stated, exceed $10 (2*l.*) per ton, therefore any ore yielding over $10 left so much profit net per ton, and the mill would reduce 400 tons per month if all worked smoothly. The ore from the surface works probably did not average over $40 (8*l.*) per ton, but the drift now being run from the engine-shaft at the 100 would, it was believed, open up reserves which would average $100 per ton. But for the boiler failure, alluded to by the noble Chairman, they would have had remittances from the mine in July last.

It was proposed by Mr. ARTHUR WHEELER, seconded by the Baron Von HERRMANN, and carried unanimously, that the retiring directors—Mr. Smith and Mr. Arundell—be re-elected.

Mr. SMITH, in returning thanks, stated he was happy to say that by recent purchases the aboriginal American element had been got rid of, and that the directors and their personal friends now held at least four-fifths of the entire share capital of the company. In fact he believed he was within the mark, and taken in connection with what had been stated by the Chairman, the shareholders generally would see that the board at least entertained no manner of doubt as to the great success which awaited the company. With regard to the American holders referred to, so far as he knew, there was no cause of complaint whatever, but at the same time he considered it an advantage that the voting power should, now that the value of the property was proved, be in the hands of Englishmen. There was perfect confidence between the shareholders on this side and the directors, therefore harmony would prevail in the management, economy would be studied, and efficiency secured.

Mr. ARUNDELL returned thanks for the honour, and said he had some experience, having devoted a good deal of attention to mining, and was quite satisfied that, working on a true fissure vein, they not only had a permanent mine, but one which would give large returns on the moderate capital to the shareholders. The manager, indeed, in the letters received last week, spoke of "immense returns," and stated that the company were "no longer adventurers, but investors in realities"—and that manager is a Scotchman. At the same time he must point out to them that a great deal had yet to be done before they could utilise the great local advantages of their position. Wood and water free of cost, as Mr. Syme had stated, were well enough in their way, when it was considered that the cost to the Comstock Mines for these indispensable elements of mining success entailed an expenditure of $6 to $7 per ton on the ore reduced at Virginia City; but they required, in order to cheapen the cost as much as possible, a wire tramway; this would enable them during the winter months to keep up a regular connection between the mine and mill. The intervening distance by road is about 4 miles, but it would only require about a mile or so of wire tramway, and he believed the cost of this would not be over 1100*l.*, and the money, as his noble friend, the Chairman, had remarked, could be found without difficulty. The directors had already written the manager on the subject. Then, Blake's rock breaker must be added to the mill, as this would save about 8*s* per day, at a first cost of 800*l.* He quite agreed with Mr. Smith that it was a matter of congratulation that they had now no American shareholders, and that as the shares were now held they stood more in the position of an association of private friends than an ordinary public company.

Mr. AGNEW enquired whether rock-boring machinery would not be found very useful, and save expense in labour at the mine.

Mr. WHEELER, who had been at the mines, said that the subject received the manager's attention. Prof. Raymond, to whom Mr. Agnew had referred, had been staying at the mill with Mr. Chalmers, and the subject had been fully discussed between them, but at the present he quite agreed with Mr. Arundell that the wire tramway and rock breaker were of more immediate consequence.

Mr. SYME said that Mr. Chalmers had sent over photographed views of the mine and mill, which were expected next week, when they could be seen at the offices of the company. Shareholders could obtain copies by writing to the secretary.

A vote of thanks to the Chairman and directors, proposed by Mr. WHEELER, seconded by Mr. AGNEW, and unanimously carried, closed the proceedings of the meeting.

EAST NANT-Y-MWYN MINING COMPANY.

A general meeting of shareholders was held at the offices, Bristol, on Thursday,

Major CASTLE, J.P. (Chairman of the Board of Directors), presided.

The notice convening the meeting having been read, and the minutes of the last meeting confirmed,

The SECRETARY (Mr. G. H. Bowyer), read the accounts, and also the report of the directors, which was as follows:—

Since the half-yearly meeting of the shareholders, in February last, the work of the mine has proceeded as much as the scarcity of labour in the district would permit. The manager has experienced the greatest difficulty in procuring any miners at all, or in inducing them when obtained to remain for any length of time in the service of the company. The water-wheel is now completed, and can be put to work when required. In the meantime the driving and sinking in the two levels and the new shafts are proceeding, and the directors believe from the report of the manager, subjoined, that the latter is adopting the most prudent course to test the ground at a point where, from the surface operations, he thinks that the principal lode will be found. Capt. Absalom Francis, of Goginan, being in June last in the neighbourhood of the mine on other business, visited it at the request of the secretary, and the directors have pleasure in submitting to the shareholders his opinion of the prospects of the mine.

Extract from report of Captain Absalom Francis, of Goginan, Aberystwith:—"Still further east the same lodes pass through East Nant-y-Mwyn, but owing to the pressure of a great cross lode and the break of the hill, the lodes where seen here are somewhat disturbed: I should, therefore, advise the driving of the Cornish men's adit further west, and to make a communication with the whim-shaft, which is only 3 fathoms from the present forebreast, and this will give good ventilation for proceeding with the adit. I would recommend this adit to be driven westward 50 fathoms, and then to cross-cut north and south, making a thorough trial of all the veins in the grant at this depth, and when discoveries are made to follow them in depth by means of your 30-ft. wheel erected on the mine, which is an exceedingly well built and well arranged one, and which can be made available for purposes of crushing, pumping, or drawing, as may be required. It is my opinion that the ground westward will be found in a more settled state, and that you will find good and remunerative deposits of lead ore in carrying out the trials herein recommended."

The directors have lately visited the mine, and their opinion confirms that of the

manager and Capt. Francis, and they believe that time and a judicious application of capital are only required to ensure satisfactory results.

The Secretary then read the report of Capt. Richard Trevithick, the manager, who says:—"In conclusion, I would say, as far as my ability will allow me, there shall be nothing spared or neglected in the working of the mine, and I hope by your next meeting to be able to inform you that we have a productive one, but which can only be proved by sinking and driving, as we are now doing."

The Chairman, in moving the adoption of the report, said he had very little to say beyond confirming in all respects the favourable opinion entertained of the mine. Last week two of the directors went down to the mine, and on their statements in a great measure the report was framed. They had not found the Comet lode, but hoped to do so shortly, as if they found that there would be a very remunerative property for them. He might say that the calls made had been generally well paid. There was one exception in the case of a large shareholder, so legal proceedings had been taken to recover the arrears due from him. If there was any question the shareholders wished to ask the directors respecting either their own inspection of the mine or the accounts they would be quite ready to answer them.

Dr. Sylvester, in seconding the motion, asked how far they were off in getting any advantage from the mine? It seemed to him the further they went the worse it got. They were rather expecting to get on to a remunerative lode before this, and he hoped the statements contained in the report may turn out right after a time. He did not like to be paying calls continually without getting anything in return.—The Chairman said they had to take the fortune of all miners. They often had to go underground a long time without getting anything very remunerative.—The motion for the adoption of the report was then put to the meeting and carried unanimously.

The Chairman, in fairness to Mr. Trevithick, who was a large shareholder and deeply interested in the mine, said he would willingly answer any question, as he knew more about the works than anyone else.

Dr. Sylvester did not think there was anything to be asked. He knew Mr. Trevithick was doing all he could for his own advantage as well as for the shareholders. If he had anything voluntarily to say to them they would be most happy to hear him.—The Chairman thought Mr. Trevithick had said all he wished in his report, and it may be that a question might occur to a shareholder on that report.

The Chairman, in reply to a shareholder, said he was afraid further calls would have to be made on the shareholders—they could not pay their way without calls.

Dr. Sylvester: How many shares have been taken up?—The Chairman: There has been no issue of shares lately.

The Secretary said there were 8818 shares on which calls were payable.

The Chairman said one gentleman held 1000 shares, on which he had paid the first and second but not the third call. Had he paid, probably they should not so soon again have asked the other shareholders for more money.

The Secretary, in reply to a question, said they had power to issue 30,000 shares, but they never intended issuing anything like that number.

A Shareholder said it was only expected that about half of the shares would be called.—Mr. Jones said they were drawing close to the whole amount being called, and asked what was to be done then?

The Chairman: We shall have no alternative but either to borrow or issue more shares.—A Shareholder: How long will what is due carry us through?—The Chairman: About two quarters. It is only fair to tell you that calls have been paid since July 1 amounting to 747*l*. The directors do not wish to make calls oftener than they are obliged to.—In reply to a shareholder, the Secretary said interest was charged on calls in arrear.

A vote of thanks to the Chairman and directors having been unanimously adopted, the Chairman, in acknowledgment, said it was a matter of congratulation to the board of directors that they had the confidence of the shareholders. They were all sailing in the same boat, and all anxious to find a good lode. If they did not find the lode they would be losers. He believed himself they would find it, and he had every confidence in Mr. Trevithick. (Hear, hear.)

Mr. Jones suggested whether it would not be better to have the ground thoroughly tested by a practical man.—The Chairman said they had the advantage of Capt. Francis's opinion, and he quite approved of the course taken by Mr. Trevithick. He was one of the most able men in the mining profession, and if the directors found they were likely to go on without a reasonable prospect of a return they would consult him, or some equally able man.—Mr. Jones said that all their expenses were going on, and it would be better to get someone to inspect the mine.

The Chairman said they had not yet arrived at the point where they expected to find the ore. If they were disappointed there he thought it was a good suggestion that some efficient captain should be sent to inspect the site.

A Shareholder: What distance are you from the ore?—Mr. Trevithick: We have 15 or 16 fms. to drive, besides the shaft.—A Shareholder: How long will that take now?—Mr. Trevithick: Three or four months from this time.

The proceedings then terminated.

WEST WHEAL SETON MINING COMPANY.

The quarterly meeting was held at the mine on Tuesday (Mr. O. Matthews, the purser, in the chair), when the accounts showed a debit balance of 111*l*. 3*s*. 6*d*.—A discussion arose about the entry of 100*l*. to Mr. Basset for land, which the agent (Capt. Bath) explained was being taken in for the purpose of adding to the works on the mine. Several shareholders were of opinion that, looking at the state of things generally, Mr. Basset ought to forego the claim for this money, and, after some conversation, it was decided to make a representation on the subject to him.—The Purser stated that whilst they had a profit on the past three months' working of 111*l*. 3*s*. 6*d*., there was a debit balance at the last account of 310*l*. 7*s*. 5*d*., which was met by a call amounting to 210*l*. He wished the adventurers to decide whether they should cut by so much at each meeting to meet the cost of the 13th pay-month which now occurred in the year, or how they should meet that sum.—Captain Teague thought the difficulty could be met by four months' labour being charged at the end of the year.—Mr. A. Lanyon, whilst agreeing that this was a good plan with dividend-paying mines, thought it better to make the provision quarter by quarter in mines which were not paying.—Capt. Teague suggested that the labour cost should be lessened, seeing that they had really made a loss in the past three months.—Captain Bath replied that they were working as close as they could, and that the cost was abating. This was because less men were employed, and he did not think they could increase their returns if he had more men at work.—The accounts were adopted, and a call of 1*l*. per share made, on the proposition of Capt. Teague, and seconded by Mr. Harris. This was done in consequence of its being agreed to put aside a sum to meet the extra month's cost, it being proposed to set by 300*l*., in addition to the 100*l*. now in hand.

TRETOIL TIN AND IRON MINE—BODMIN.

Many of our readers will be pleased to learn that the stamping and dressing machinery at this mine was successfully set to work on Saturday last. Four heads of Husband's patent pneumatic stamps have been erected (equal to from 30 to 40 of the old heads), and are worked by a turbine and a powerful compound engine. Arrangements are being made for the supply of four additional heads, and the directors intend gradually to increase the number to 12 or 14 heads, for which ample power has already been provided. The dressing-floors are laid out so as to allow of considerable extension at the least possible cost, and already include seven round and two square buddles, with all the most modern appliances, the important consideration of the saving of as much labour as possible having been most carefully studied. A self-acting tramway, nearly ½ mile in length, has been constructed for conveying the stuff from the mine to the stamps, and one of Oxland and Hocking's patent calciners is approaching completion. A winding-engine has also been erected, and the shaft enlarged and re-timbered from top to bottom, so as to admit of the wagons containing the ore being brought to the surface, and to do away with the frequent handling of the ores which occurs under the old system. A set of pumps has also been fixed in the shaft for drawing the water to feed the engine, which is also constructed to drive a circular saw for cutting the timber required in the mine.

There are upwards of 2000 tons of tinstuff on the bank ready to send to the stamps, as the directors expect that as soon as their present machinery is in full swing to be in a position to return upwards of 10 tons of tin per month. The tin ground already opened out shows sufficient tinstuff to last seven years at the return above named, and as this ground only includes a fifth part of the sett on the course of the lodes, the directors are clearly right in laying themselves out for working on an extensive scale. In addition to this, they expect shortly to cut the south lodes, which will both double the capabilities of the mine and the value of the property, and this without any pumping machinery being required. The iron ore continues of the same high quality, and there is no falling off in the yield, another run of iron having, in fact, been discovered within the last few weeks.

To celebrate the starting of the machinery a dinner was given on the same day to the miners, and all others in the employ of the company, when about 90 persons partook of a most substantial repast, cooked and served on the mine by Mrs. Hooper and Mrs. Williams, to whom very great praise is due for the manner in which they discharged their self-imposed duties. Mr. John Postlethwaite, jun., one of the directors, and Dr. Couch (doctor to the mine) presided at the first table; Capt. Hooper and Mr. John Martyn, of Wadebridge, presiding at the second; and Capt. Williams, the underground agent, seeing that everyone was supplied with the good things provided. After the removal of the cloth, the chair was taken by Mr. John Postlethwaite, jun., and the vice-chair by Dr. Couch, who gave for a toast "Success to Tretoil Mine," which was accompanied by three hearty cheers from all the miners.

The Chairman, in responding, expressed the pleasure and satisfaction it gave the company to have such a staff of able, respectable, and well conducted men; it being a rather remarkable circumstance, though no less true, that fully two-thirds of them were total abstainers, while the rest were very moderate and particularly steady, the loss of a day's work through dissipation being a thing quite unknown amongst them. He assured them that so long as they continued to do their part of the work honestly and faithfully the directors would use every means in their power to extend the operations of the mine. He then gave the health of Captain Hooper and Capt. Williams, and went on to say that he and his colleagues had found them to be good men and true, to be men with great mining skill and experience; and, like all good managers, not only did they know how to superintend the work of a mine, but they were practically and thoroughly acquainted with every detail connected with the work. They were also (and he took this to be a great element in a manager's character) liberal-minded men: he meant that they were not prejudiced and wedded to old systems, they had no prejudices against new and more effectual modes of mining—they were guided by reason, and were, therefore, open to proof, though they were at the same time cautious and did not adopt new measures haphazard. They had shown not only great skill in opening out Tretoil, but great perseverance and energy, for they had had many serious difficulties to encounter, and they were entitled to the hearty thanks of everyone connected with the undertaking. They had been connected with Tretoil since its commencement, and the directors hoped that they would long continue to have the working management of the mine, as they were satisfied that they could not be in more skilled or trustworthy hands.

Capt. Hooper, in responding, gave a short outline of the prospects of the mine, with the plan for future operations, and impressed upon the men the necessity there was on their part to do their duty as miners to promote the general interests of the mine, and to do their work as if the mine were their own property.

Capt. Williams spoke to the same effect, and Capt. John Dawson, the agent in Somersetshire for the Furzeham Iron Ore Company, who are the principal shareholders in Tretoil, gave some interesting particulars of the manner in which some mines are managed, where the men are not allowed to get beyond such a figure as might be allowed by the agent, even though they had done double work. This he considered was a great mistake in mining, and he was happy to say that Tretoil Mine was managed far different to that. He had been acquainted with Capt. Hooper and Capt. Williams for years, and knew them to be men of great mining skill and experience.

Captain Hooper, in proposing the health of the directors, spoke to their great ability as a body of men, and said that he had never worked under better masters.

Captain Williams also spoke in highly complimentary terms of the directors.

The Chairman, in returning thanks on behalf of himself and his brother directors, said he was very grateful for the way in which they had been pleased to receive the toast. He could assure them that what work had been done had been well and carefully considered; at the same time he was bound to say that his duties had not been particularly onerous, as they were blessed with a very able and energetic managing director, who not only took the bulk of the work on his own hands, but did it speedily and effectually; indeed, he had been the mainspring of Tretoil, and to him was due the very great progress that had been made, for he would let nothing flag: all must go on, and go on briskly too, or he would know the reason why.

Capt. Hooper proposed the health of the engineers, John Knight and James Russell (of Liverpool), and of Mr. Warne, the mason contractor, who severally responded; the latter expressing his great approval of the management of the mine, in particular the ability shown in the arrangement of the men for doing their work without confusion. In many mines the work had to be done over again, but he was happy to say there was nothing of this kind in Tretoil, and stated that in no other mine had he ever found men of such good moral character, nor had he ever seen so much work done in so little a time as he had at Tretoil. He did not say this with any idea of flattering the agents, it was simple fact.

The Chairman proposed the health of the visitors, coupling the name of John Martyn, Esq., who ably responded.

A band consisting of ten musicians, the greater part of whom belonged to the mine, was in attendance, and ably contributed to the pleasure of the meeting.

The band played "God save the Queen," and the company separated evidently much gratified with the afternoon's proceedings.

LANESTOSA LEAD AND ZINC MINING COMPANY.

The third general meeting of shareholders will be held on Aug. 21.

The report of the directors states that the total expenditure during the year has amounted to 3349*l*. 2*s*. 6*d*., against which there is a credit of 915*l*. 6*s*. 6*d*. for proceeds of ores sold, and at that date the company was free from liabilities, and had still a balance of cash amounting to 867*l*. 0*s*. 10*d*. The result of the operations at that mine has been rather discouraging, the mines having yielded less ore, both of lead and calamine, than had been expected. There are still points of promise in the mines, any one of which when further explored may open out ore in large quantities; indeed, quite recently a good deposit of both calamine and lead ores has been met with at the Ascuncion Mine, and the superintendent estimates that about 150 tons of ore will be obtained from this source. Operations have been recently commenced at La Berta principal, and there are four lodes passing through this sett, and it is believed that these lodes converge and form one main lode at no great depth from the surface. A shaft has already been sunk to a depth of 10 fms. with a view of proving these lodes, and one has already been reached; this lode is interspersed with lead, and presents favourable indications. In order to prove these lodes, and to complete the trials at the other mines, some further capital will be necessary; the directors, therefore, recommend that a call of 5*s*. per share be made. There are now 165 tons of calamine and lead ores at the mines awaiting shipment, which will be realised as soon as possible.

[For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

A fall is considered to be imminent in the Belgian coal trade; the impression that this is the case appears to be gaining ground. The quantity of German coal forwarded to France and the Liége and Charleroi basins appears to be continually increasing, and is now estimated at 120 truck loads per diem. The coal required for gas-lighting purposes, amounting to from 50 to 80 trucks per day, is forwarded daily through the province of Liége; large deliveries are also made *via* the Great Central Belgian Railway. Numerous arrivals of English coal are remarked at Antwerp, in addition to deliveries from Germany. In consequence of the depressed state of Belgian metallurgical industry, one or two Belgian establishments are said to be suspending the production of agglomerates. Almost everywhere in Belgium the demand for coal may be said to be declining; purchases are only made from day to day, and buyers show all the less eagerness to conclude transactions, as they consider that they have nearly reaped the fruits of their patience. The production of coal in Belgium is somewhat reduced for the present, in consequence of fêtes, and the pressure of harvest work; but these circumstances also exert some influence upon almost all Belgian coal-consuming industries. The production, accordingly, does not appear to be at all inferior to the requirements of the moment. The Gosson-Lagasse Colliery Company will pay, on Sept. 1, an interim dividend of 12*l*. per share for 1873.

A certain revival has been noticed in copper at Paris. Chilian in bars, delivered at Havre, has made 88*l*.; ditto in ingots, 88*l*.; and Corocoro minerals, 86*l*. per ton. There has been little business passing in copper at Havre. The aspect of the German copper markets has not experienced any material change. There has not been much business passing in tin at Paris; Banca has been quoted at 144*l*.; Straits, at 150*l*.; and English, at 146*l*. per ton. Tin has not been weaker at Rotterdam; Banca has made 79½ fls. to 80 fls.; and Billiton, 78½ fls. The German tin markets have been rather colourless; business has been generally confined to the current requirements of consumption. The Paris lead market has been inactive; French lead has realised 23*l*. 12*s*.; Spanish, 22*l*. 16*s*.; and Belgian and German, 23*l*. 12*s*. per ton. The German lead markets—Hamburg excepted—have been generally rather feeble. The Paris zinc market has been rather weak; Silesian, delivered at Havre, has made 27*l*. per ton; other good marks, delivered at Havre, 27*l*. 12*s*. per ton; ditto at Paris, 27*l*. 8*s*. per ton. At Hamburg zinc has been rather neglected.

At a small adjudication of rails—310 tons—for the Belgian State railways the lowest tender was that of M. Boucquéau, who offered to supply the quantity required at 11*l*. 6*s*. per ton. This price cannot be regarded as a very brilliant one, all things considered. Rails appear, however, to support their prices better than many other articles. The Belgian iron trade is certainly in a disordered and difficult state. The Montigny-sur-Sambre Blast-Furnaces and Rolling-Mills Company have closed their works for the present; the suspension of operations took effect as from August 15. The South of Charleroi Company have blown out the fifth of their furnaces. The Belgian Lion Company have also stopped their rolling-mills, and other instances might be cited to the same effect, while some of the works which continue employed are not likely to remain very long in operation. It could not well be otherwise, since merchants' iron has been sustained with great difficulty at 11*l*. 4*s*. per ton, and has even declined in some cases to 10*l*. 16*s*. per ton. Moselle (Ottange) pig is being offered at 4*l*. 16*s*. per ton taken at the works; refining pig, hard iron, to be delivered at the close of the year, is also offered at Longwy at 4*l*. 17*s*. 3*d*. per ton, while refining English pig is dealt in at 4*l*. 16*s*. to 5*l*. per ton on trucks at Antwerp, and Westphalian speigeleisen is worth 11*l*. per ton on trucks at Herbesthal. There seems little prospect of an early improvement in price, but what renders the state of affairs really bad is the want of orders and the impossibility of reducing prices without working at a loss. A revival in affairs will, however, no doubt be witnessed as soon as a sensible fall in coal enables Belgian ironmasters to make the concessions for which consumers are looking before they will consent to do business. The Great Central Belgian Railway Company has given out an order for 700 trucks.

In the French iron trade prices are either weak or are actually declining, and new orders do not come to hand. Purchasers are hoping for easier rates, and most of the forgemasters cannot make any further concessions; this is the explanation of the present difficult state of affairs. Harvest work has absorbed many of the working classes, and the great heat which has prevailed has also had a tendency to check production, but the number of workpeople altogether unemployed seems to be increasing. Pig, and especially refining pig, is naturally a good deal neglected; there is little profit in making it, and little profit also in buying it in order to work it. Merchants' iron stands at about 11*l*. 4*s*. per ton, but remains rather below than above that price in the few transactions which are concluded. Casting pig-iron is in no great demand, but prices have, nevertheless, been tolerably well supported. Steel has not been so much depressed as iron upon the French markets; its price has proportionately fallen, to some extent, but its use is every day extending, and makers regard the future with some confidence. The dearness of iron rails, and other descriptions of iron, tells in favour of steel.

A *questionnaire*—or form of questions—has been addressed by a French Commission on the coal supply question to French consumers of coal, merchants, and industrials, as well as to all French coal producers. Answers will be received until the commencement of October, and the work of collating them will, of course, occupy a considerable time. While the commissioners are thus pursuing their labours there are some hopes that the coal crisis will be brought to a close, and that the production will no longer prove insufficient. The fall in coal which has set in in England certainly appears to be making some progress also on the French markets. Almost all the coal which has arrived at Paris during the last few days is stated to have come from England; the principal ports on the western coast of France have, indeed, exhibited quite an unusual amount of animation in consequence of the large imports of English coal. Nevertheless, the increased supplies of foreign coal which have come to hand in France have not sufficed to remove the general depression which high prices have caused; the ironworks, the glassworks, and the sugarworks are all struggling with great difficulties. The Blanzy Mines Company has been paying this month a dividend of 9*s*. 10*d*. per share.

The Acoz Forges Company has earned 10 per cent. upon its share capital for the past year, besides forming reserves to the amount of about 7 per cent. of that capital. The Longterne-Ferrand Co'liery Company has been making arrangements for raising 20,000*l*. for sinking a third pit. The report of the Charleroi Chamber of Commerce shows that the coal production of the province of Hainault was increased last year to the extent of 1,589,230 tons; the production was thus carried to 11,626,460 tons. In 1861, the corresponding production did not exceed 7,955,643 tons.

FOREIGN MINES.

San Pedro.—R. M. Kitto, June 16: New Shaft: The 150 fathom level cross-cut, driving south of west to intersect the manto San Pedro, by four men at 340 per metre; ground is changing, getting a little easier in the past 15 days. We have cut several small branches, the whole containing mundic and bronces, which is a very good indication, the end is very wet, and all the branches are letting out water freely; this cross-cut has drained the 135 fm. level. In a fortnight we shall be in the bottom of this level in a good manto of ore. The 135 from south part of manto, driving north 45° east to cut through the manto; this end will produce 2 tons of 25 per cent. ore per fathom; here the metal is entirely changed, with splendid looking lode in the bottom, and there is a little water coming out of the end, but it disappears before it gets to shaft. A stope in the back of the 128, south part of manto, will produce 5 tons of 20 per cent. ore per fathom. A new side level driving at the 122, driving from south part of manto, driving north 42 east, will communicate in the firm part of the level, about 30 metres south of shaft; the timbers in this level are all in a very bad state—there is plenty of ore to come away from the back of this level, and in two months the 128 stope will be communicated, when we shall have to cut out the back boards and begin to stope the back of the 122 fm. level; I hope to meet with plenty of native copper here. A stope in the back of the 128, west part of manto, will produce 6 tons of 16 per cent. ore per fathom. A stope in back of the same level, east part of manto, will produce 3 tons of 20 per cent. ore per fathom. A chiffon sinking in the bottom of this level, east part of manto, will produce 2 tons of 25 per cent. ore per fathom.—Santa Helena Mine: Stoping the back of the adit level by one man, and will produce 1 ton of 30 per cent. ore per fathom; the ground is hard here. In conclusion, I beg to state the San Pedro Mine is looking splendid in the bottom, and I have never seen better indications of having a rich and lasting mine when the machinery is erected. We have got everything quite secure from the 122 fm. level to the bottom of the mine. At surface I am making preparations for a large ore floor, that we may prepare from 10,000 to 20,000 quintals of ores monthly for sales.

— R. M. Kitto, July 2: New Shaft: The 150 fm. level cross-cut, driving south of west to intersect the manto San Pedro, is suspended on account of water, we cut a branch which drained the 135 fm. level quite dry for 70 metres; this is the best indication we could expect, there are splendid stones of yellow copper ore in the branch, and the country is all highly mineralised; we are still 6 metres off from the manto by my calculation. If we cannot draw out the water with the horse-whim I shall wait until the engine is erected; however, I think after the manto drains a little we may be able to keep on the cross cut to cut the manto. A winze sinking below the 135, north part of manto, will produce 3 tons of 25 per cent. ore per fathom. A chiffon sinking below the 135, east part of manto, will produce 2 tons of 25 per cent. ore per fathom. A chiffon sinking below the 135, south part of manto, is producing good stones of yellow ore; I have never seen a prettier change than is taking place here, we are very near a large cross course, which makes very rich deposits of copper; at this point the manto has taken a sudden turn in the underlie, it is now underlying north towards the shaft. The 135, driving north from south part of manto, is communicated with another level, and is suspended. A stope in back of the 128, south part of manto, will produce 3 tons of 20 per cent. ore per fathom. A stope in back of the 128, west part of manto, will produce 6 tons of 16 per cent. ore per fathom. A stope in back of the 128, east part of manto, will produce 3 tons of 20 per cent. ore per fathom. A new side level driving at the 122 from south part of manto, to communicate with a firm level, driving by two men, at 312 per metre; the ground is quite solid and firm. I am glad to state we have accomplished a great deal in the 10 months since he began to sink the shaft, and if what the engine ready for working we could raise large quantities of ore from the 50 we have sunk the shaft 30 metres, cut a plat, and have driven the bottom level 16 metres and began another cross cut towards the manto Verde at this level, so as not to interfere with the skip-road when the engine is working. Mr. Phillips has arrived at the mine, and the first lot of machinery was brought by the carts to-day from Salado Station.—Santa Helena Mine: Stoping the back of the adit level will produce 1 ton of 30 per cent. ore per fathom.—San Antonio Mine: A chiffon sinking from surface by one man is producing good stones of ore. In conclusion, I beg to state everything is in readiness for the engine: we shall have no difficulty in hoisting up the large boilers. I have contracted with a bullock team of eight yokes of oxen with eight or ten mules; the bullocks with drivers will cost 82*l*. per lay, besides meat and water. We calculate on getting the boilers up in six weeks time.

Battle Mountain.—Capt. Richards, July 19: Since the commencement of operations under my superintendence the mine has been deepened to 295 ft.; this point has been reached in Pascoe's winze, near the Virgin shaft. In Pascoe's winze (the deepest point) the ledge assumes a very much improved appearance, being of large size, better defined, and some rich ore has been taken therefrom; this is suspended until the new shaft shall have reached this depth, or below it, when drifts can be extended therefrom to any point we wish. The 188 ft. drift was extended a few feet only north of Bishop's winze, near the Virgin shaft, the lode having very materially improved, and produces some splendid ore, showing a very great improvement from the level above (the 113). The 113 ft. level, north of the Virgin, has been driven about 440 ft., and has been in places very productive in ore: one exceedingly good feature is noticeable herein, the quality of the ore increasing in richness as depth is attained, some fine ore is still being taken from the back of the 145 ft. drift, north of Daniel's winze. In the bottom of the 113 three winzes have been sunk—Bishop's, Daniel's, and Pearce's. In the 73 ft. drift, north of the Virgin shaft, we have extended north above 600 ft.; the lode has shown two or three distinct shoots of ore, proving the extension of the ore in length as well as in depth, for at Hooper's rise, which is 455 ft. north of Virgin shaft, there is a good lode of ore, and which is now being worked by stopes. This drift (the 73), extended north of Hooper's rise about 145 ft., contains some good stones of ore, which will be proved by rises as soon as time admits. Hooper's rise, in the back of the 73, has been communicated with the surface, proving the lode for a height of 247 ft. 8 in., and giving a supply of pure air to the workings, the value of which cannot be over estimated. The 57 has not been extended, and is just at the point where Jury's rise came up from the 73. It is over this rise where a rise will be put through to the surface, which will prove the lode, and from that portion of the new shaft Jury's rise will form another portion, and Truscott's winze, below the 73, will form the portion reaching the 113. I think this will prove to be an exceedingly good mode for trying deeper points, and opening up more cheaply and expeditiously the ore ground gone down below the 113, than any other; and, moreover, the new shaft will be in the midst of good ore ground, and as it will prove the lode all the time as we sink it is far preferable to any other place. I think, looking at the promising lode in Pascoe's winze, 295 ft. deep, the fine ore ground opened up by the 145 ft. drift—a distance of 270 ft. north of shaft—the fine ore we had in the back of the 113, south of John's rise, 460 ft. north of Virgin, looking at the ore gone down in the 145, and the fine stones of rich ore from Daniel's winze, 183 ft. deep, &c., that the prospects of the mine were never so encouraging as at the present moment, and I am of opinion that the present contemplated trials will result in opening up one of the finest mines on this coast.

Bensberg (Lead).—J. W. Hoffmann, July 31: This month we resumed sinking the Victoria shaft, and made 4 ft. progress during the month; there is no material change in the nature of the ground; it is very hard, and contains much iron pyrites, sprinkled with particles of galena. The total depth of the shaft is now 58 feet. We have not noticed any increase of water as we get deeper, which is doubtless owing to the dry weather at present, and we therefore expect to arrive at the 20 metre level by the end of September. The small pump is alone at work, and keeps the shaft perfectly dry. In the open cast we have gone 1 metre deeper at the north and west ends. From the north vein we got 96½ tons dry weight of carbonate, assaying 37 7-10 per cent. of metal, 2 tons of rock ore assaying 34 4-5 per cent., and about 100 tons of rock ore. The latter was put through the dressing machinery, but owing to the great quantity of iron pyrites it contained (which is very difficult to separate from the lead ore) it produces very poor results. The north vein has latterly, however, improved very much, the iron pyrites disappearing very considerably, and the lead ore becoming more solid. The entire width of the vein is now 9 ft., and consists of carbonate of 35 to 40 per cent., and rock ore varying from 10 to 35 per cent. assay. The vein runs from east to west, the same as all others here, becomes more closed towards the west, and extends beyond the present limits of the open cast. The dressing machinery was completed and set going in the course of the month. There were several difficulties to overcome and alterations to make (as might be expected with new machinery), which occupied some time; we are now, however, fairly at work. For August we expect to produce about 75 tons of dressed ore, which, with 120 to 125 tons of carbonate from the open cast, will make our delivery for that month about 200 tons. Some further improvements which we intend making in the machinery may increase our monthly production of dressed ore to 100 tons. The bridge from the inclined plane to the dressing floors is completed, and will be erected next week, when we shall fix the steam-winch in its position. Owing to some festivities in the neighbourhood, the carpenters have been absent for several days, thus causing a delay. The necessary shafting, pulley, and bearings for the stone-breaker (which arrived during the month) have been ordered, and will shortly be ready. The storehouse, which was commenced early in July, is now completed.

Lanestosa.—July 31: Asuncion: An exploratory shaft is being sunk under bottom of cave and raised up through it; some barren ground has been passed through, but there is now a good branch of mixed ores in bottom; the ground is also more set ed, with good signs of the ore holding down, and yielding ½ ton of lead ore and 1 ton of calamine per fathom. A good vein of calamine continues in south level from cave, but less mixed with lead; profitable ground is being opened up here, yielding 1½ ton of calamine per fathom.—Glanrafon: The lode driven on deep adit level north from cross-cut is increasing in size (now 3 ft. wide), and although not yielding so much blende as before is a very promising end.—Aurora: Zalacain's pitch has become too unprofitable to continue working.—La Berta: In Gwillermo shaft the lode is 3 ft. wide, with fluor spar in silicious rock, with spots of lead; it is now taking such a flat dip that it will be necessary to wait the bringing up of adit cross-cutting all the lodes to see if the one now in bottom be the best one to sink the shaft on. In the shallow adit we had expected to have cut into No. 4 lode before now, but the ground continues hard, and progress is consequently slow. I estimate the quantity of ore extracted for the month at 14 tons of lead and 20 tons of calamine and mixed ores.

[For remainder of Foreign Mines, see to-day's Journal.]

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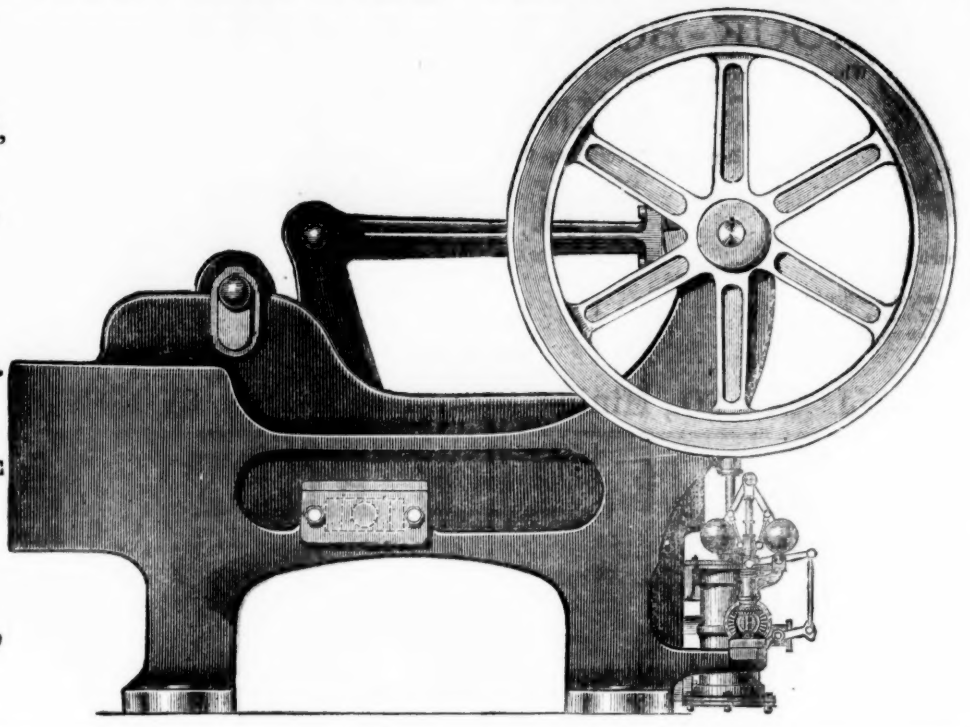

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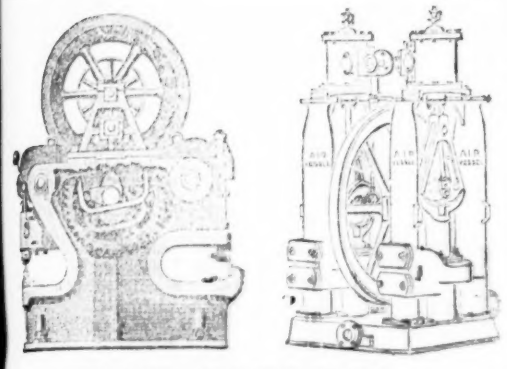

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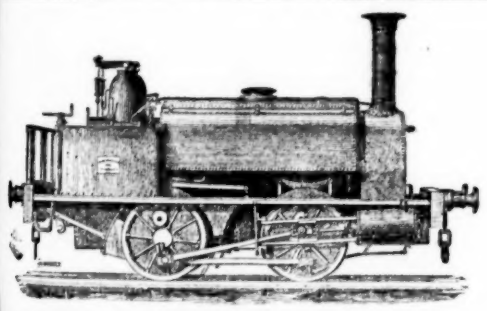

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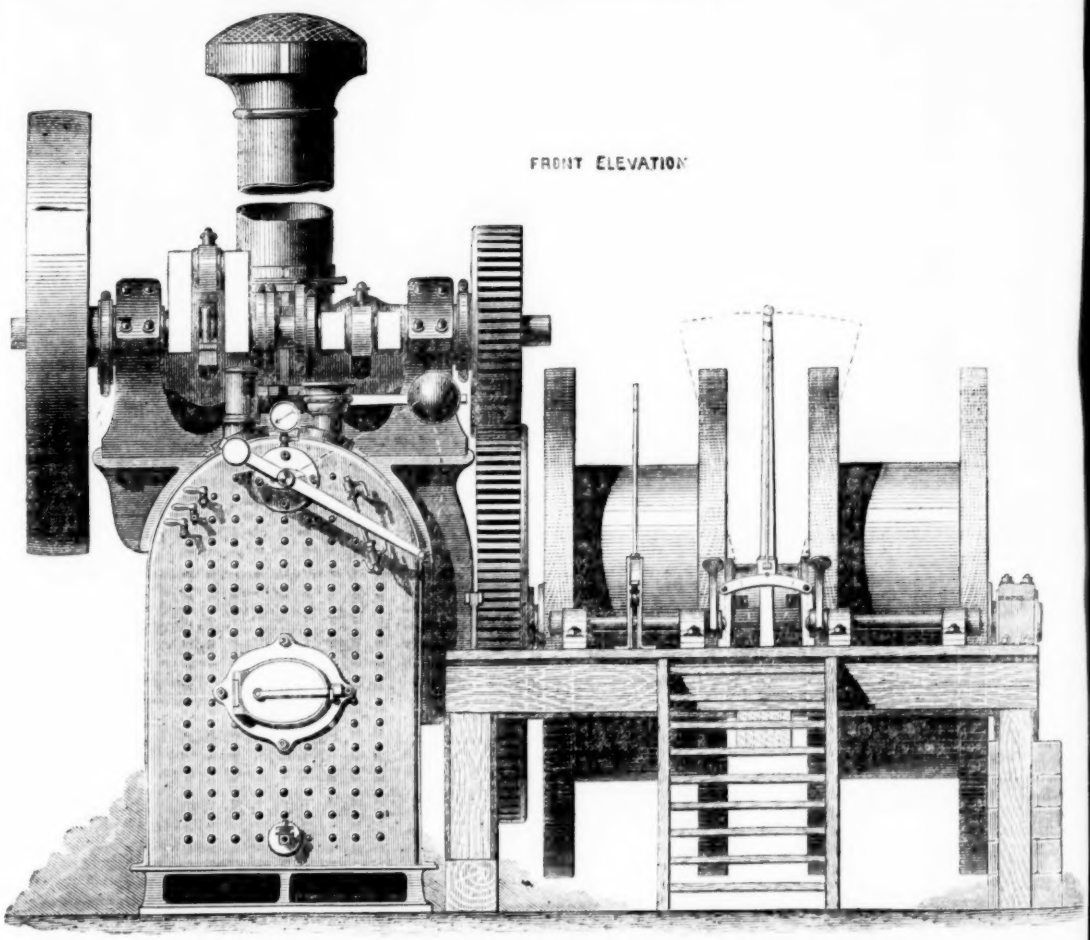

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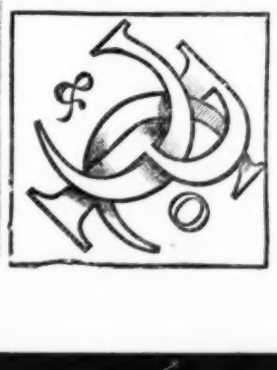

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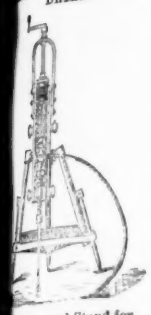

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PATENTEE & SOLE PROPRIETOR.

For driving the "Burleigh" Drill, or other Machinery.

The peculiar advantages which enhance the value of this Machine in the estimation of those who have it in practical use are—

1.—The pump pistons are driven by a steam-engine, the connection rods being attached to one crank shaft, the angles being so set that when the greatest power is developed in the steam cylinder the point of the greatest compression is being reached alternately in the air cylinders.

2.—The heat generated by compression of the air is reduced to *nil*.

3.—It is strong and durable compared with its effective power.

For further particulars, and all information relating thereto, please address—

T. BROWN & CO.,

ENGINEERS,

96. NEWGATE STREET, LONDON, E.C.;

WILSON, McLAY, & CO.,

SOLE AGENTS,

2, TALBOT COURT, GRACECHURCH STREET, LONDON, E.C.;

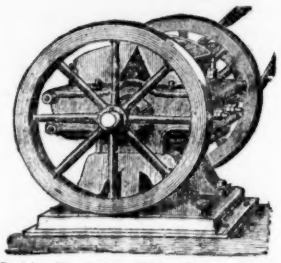
AND

87, ST. VINCENT STREET, GLASGOW.

CRAVEN BROTHERS,

THE MAKERS,

VAUXHALL IRON WORKS, OSBORNE STREET, MANCHESTER.



Machine No. 1—The Direct Double-Action.

IMPROVED

PATENT STONE BREAKING, QUARTZ CRUSHING, AND GRINDING MACHINERY.

Messrs. T. BROWN and Co., ENGINEERS, have much pleasure in calling attention to their IMPROVED MACHINERY for STONE BREAKING and QUARTZ CRUSHING, for crushing, grinding, or triturating Stone, Flint, Minerals, Ores, Chemicals, and other substances; for washing and separating Metals from Ores, and for extracting Gold from Quartz.

The principle of this invention is applied to machines of various construction, which contain within the range of their capability the power of reducing all hard materials to cubes of from 2½ inches to impalpable powder. The mechanical construction of each description of machine is specially adapted for its own peculiar work, and experience has shown that each is eminently suited for the work for which it is designed.

They can be driven by water, steam, or horse power; they are light and portable, and their crushing and grinding surfaces are so constructed that when worn they can easily be replaced.

If intending purchasers would send a sample of the materials required to be crushed or broken it could be operated upon in their presence, and thus they would be guided in the selection of the machine best suited for their requirements.

For prices, and all information relating thereto, please address—

T. BROWN & CO.,

ENGINEERS,

96, NEWGATE STREET, LONDON, E.C.

Or their representatives,—

WILSON, McLAY, & CO.,

2, TALBOT COURT, GRACECHURCH STREET, LONDON, E.C.;

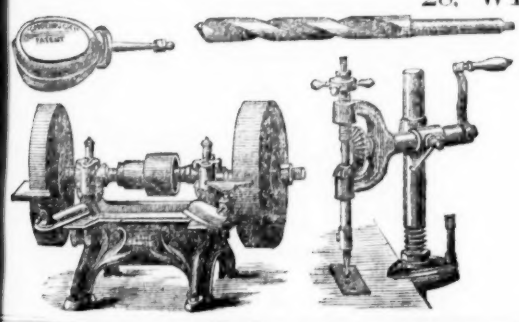
AND

87, ST. VINCENT STREET, GLASGOW.

CHARLES CHURCHILL AND CO.,

IMPORTERS AND FACTORS OF AMERICAN MACHINERY AND TOOLS,

28, WILSON STREET, FINSBURY, LONDON, E.C.

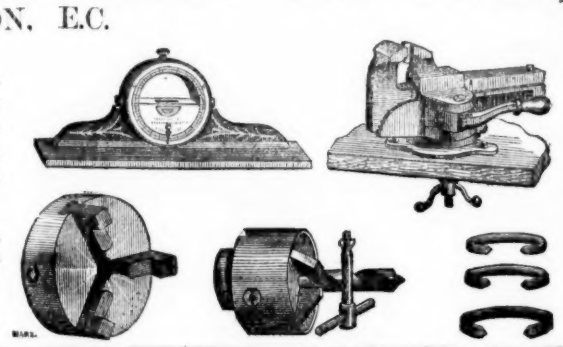


SOLE AGENTS FOR

Morse's Twist Drill, and Machine Company's celebrated Twist Drills and Chucks; American Scroll Chucks; Stephens' Patent Vices; Parker's Patent Parallel and Swivel Vices Gould Manufacturing Company's Well and Cistern Pumps; Washita, Arkansas, and Hindostan Oil Stones; and all other descriptions of American Tools and Machinery &c., &c.

C. C. and Co. are prepared to give quotations and execute indents for American Goods of all descriptions, to be shipped to any port.

CATALOGUES AND PRICES CURRENT ON APPLICATION.



M'TEAR AND CO.'S CIRCULAR ROOFING FELT,

FOR

GREAT ECONOMY

AND

CLEAR WIDE SPACE.

For particulars, estimates, and plans, address,—

M'TEAR & CO.,

0, BUDGE ROW, CANNON STREET, LONDON;

51, PORTLAND STREET, MANCHESTER;

OR

CORPORATION STREET, BELFAST.

The above drawing shows the construction of this cheap and handsome roof, now much used for covering factories, stores, sheds farm buildings, &c., the principal rafters of which are double bow and string girders of best pine timber, sheeted with ½ in. boards, supported on the girders by purlins running longitudinally, the whole being covered with patent waterproof roofing felt. These roofs so combine lightness with strength that they can be constructed up to 100 ft. span without centre supports, thus not only affording a clear wide space, but effecting a great saving in the cost of roof and uprights.

They can be made with or without top-lights, ventilators, &c. Felt roofs of any description executed in accordance with plans. Prices for plain roofs from 30s. to 40s. per square, according to span, size, and situation.

Manufacturers of PATENT FELTED SHEATHING, for covering ships' bottoms under copper or zinc.

INODOROUS FELT for lining damp walls and under floor cloths.

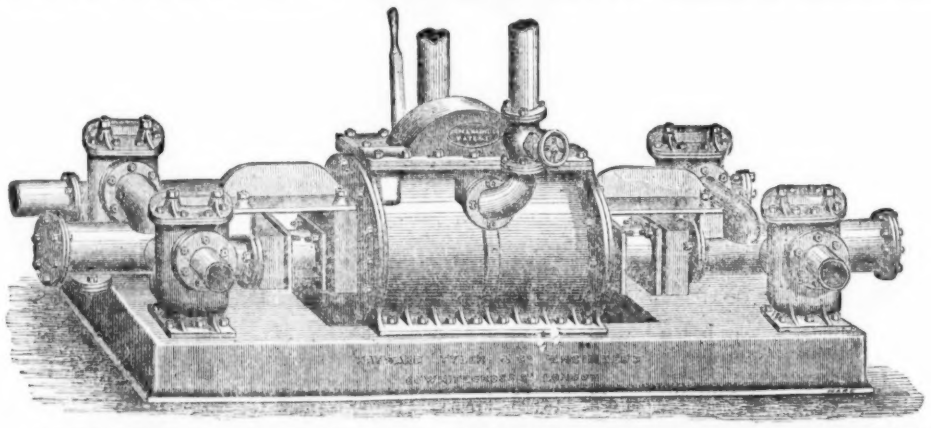
FURRY HAIR FELT, for deadening sound and for covering steam pipes, thereby saving 25 per cent. in fuel by preventing the radiation of heat.

PATENT ASPHALTE ROOFING FELT, price 1d. per square foot.

Wholesale buyers and exporters allowed liberal discounts.

PATENT ROOFING VARNISH, in boxes from 3 gallons to any quantity required 8d. per gallon.

HAYWARD TYLER AND CO.'S PATENT STEAM PUMPING MACHINERY.



"About a year and a-half since a direct-acting pumping-engine was erected at the Trimdon Grange Colliery by Messrs. Hayward Tyler and Co., of London. The diameter of the steam-cylinder of this engine is 40 in., that of the rams 10 in., the pump-plungers having a 4-ft. stroke. The whole of the combined apparatus is carried on a solid bed-plate, and the pumps are so arranged that they can be drawn off endways, if required, a planed groove being formed in the bed plate to keep them true. A pumping-engine of this description requires no very accurate adjustment of level, as it is self-contained, and all the strains are direct from the steam-cylinder to the pumps, which at their underside are attached to the bed-plate, and are supported by a strong stay above. The engine at the Trimdon Colliery is placed in a headway cut for its reception, at a depth of 400 ft. from the surface, and a short distance from the main shaft. The pump takes its water from sump, into which the level drains. The pumping-engine continues to do its work in a satisfactory manner, and at a recent trial made by Mr. R. Forster, engineer it was found that the pump was throwing to bank, a distance of 400 ft. above itself, 245½ gallons of water per minute, the pump running at 10 strokes, thus doing 89·5 per cent. of its theoretical duty."—See *Engineering*, 3rd Jan., 1873.

Full particulars, references, testimonials, &c., post free, on application to—

HAYWARD TYLER AND CO.,

84 AND 85, UPPER WHITECROSS STREET, LONDON, E.C.

VIENNA EXHIBITION, GROUP XIII, STAND No. 457. INTERNATIONAL EXHIBITION, LONDON, No. 2 ENGINE SHED, WEST SID

TANGYE BROTHERS AND HOLMAN

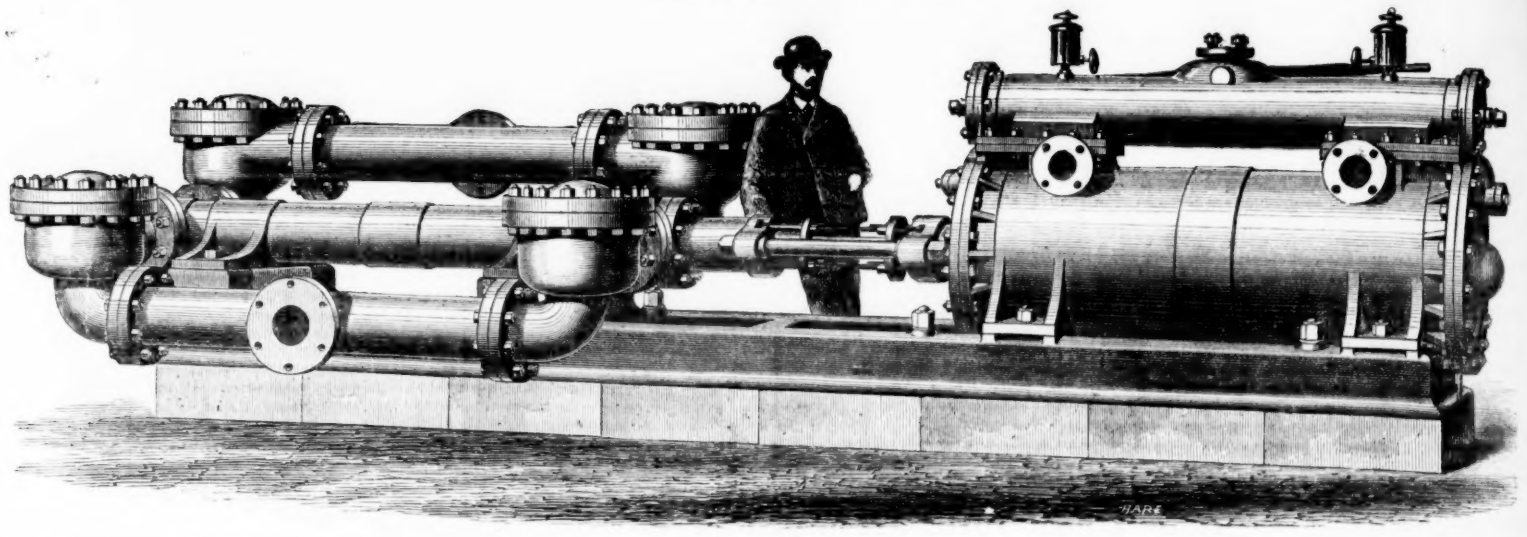
10, LAURENCE POUNTNEY LANE, LONDON,

CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM,
NEWCASTLE-ON-TYYE (TANGYE BROTHERS AND RAKE), OFFICES AND WAREHOUSE, ST. NICHOLAS' BUILDINGS.
SOLE MAKERS OF

THE "SPECIAL" DIRECT-ACTING STEAM PUMPING ENGIN

FOR FORCING WATER FROM MINES.

Nearly 3000 in Use.



The "SPECIAL" Direct-acting Steam Pumping Engines require no costly Engine Houses or massiv foundations, no repetition of Plunger Lifts, ponderous Connecting-rods, or complication of Pitwork, an allow a clear shaft for hauling purposes.

Extract from "ENGINEERING," September 6th, 1872:—

"The accompanying engraving illustrates a large specimen of the 'Special' Steam Pump, which was brought before the public about four years since by Messrs. Tangye Brothers and Holman. The Pump is the invention of Mr. S. Cameron, of New York, and since its introduction Messrs. Tangye have turned out nearly 3000 from their works.

"These pumps are of various sizes, and at first only small ones were made, but as their usefulness became developed the manufacturers designed pumping engines on the same principle for use in collieries. They were first applied to this purpose in the Newcastle collieries about three years since, and through the efforts of the late Mr. A. Stansfield Rake, under the direction of Messrs. Tangye, about 130 of these pumps had been introduced—principally in the collieries of the Durham and Newcastle districts, up to the end of 1870. They were adapted to perform the required duty—varying in almost every case—of forcing from 1000 to 10,000 gallons per hour from depths ranging from 100 to 500 ft. The succes of this system of pumps led Mr. J. Bigland, the manager of Messrs. Pease's Bishop Auckland Collieries, to conclude that it was adapted for yet heavier work. The result of his investigations into its working led to the manufacture of the engine we have illustrated, for the Adelaide Collieries, belonging to Messrs. Pease, at Bishop Auckland.

"The construction of the Special Steam Pump is so well known that we need now do no more than refer to the dimensions of the various parts. The steam cylinder is 26 in. diameter, and the pump—which is double acting—is 6¾ in. diameter, with a 6-ft. stroke. The slide valve is steam-moved, and its alternate action is effected by means of two steel reversing valves, operated by the piston in the interior of the cylinder at either end. Hence there is no external mechanism except the piston rod, a few inches only of which is seen reciprocating between the stuffing boxes of the steam and pump cylinders. In the contract it was stipulated that the engine should raise 120 gallons per minute 1040 ft. high in a single lift, and this is more than accomplished, with apparently as much ease as if its load was delivered at only 100 ft. high.

"The engine-room at the Adelaide Collieries is situated at a depth of 1040 ft. below the surface, and is an arched chamber, about 100 ft. long by 20 ft. wide, and 10 ft. high at centre. At the far end of this chamber is a double-flued boiler, 27 ft. long and 7 ft. in diameter. Placed between the boiler and the shaft is the pumping engine we have been describing. It was started on June 6, 1871, and Mr. Bigland reported that, having measured its duty, he found the average of seven trials to be 137 gallons per minute, thus giving a higher duty than was stipulated for in the contract.

"A still larger Special Steam Pump than the one already described has since been made by Messrs. Tangye for Messrs. Stannier[illegible] lieries, Silverdale, Staffordshire. The steam cylinder of this e[illegible] is 32 in. in diameter, and the water cylinder 10½ in.; the stro[illegible] 6 ft., and the engine has to raise 22,500 gallons per hour 540 ft. Two out of eight engines for some extensive coal mines in Germ[illegible] are also in a forward state; each of these engines is to be cap[illegible] of raising 150 gallons per minute, or 9000 gallons per hour, 7[illegible] high. This system of underground pumping engine undoubt[illegible] carries with it the recommendations of simplicity and great po[illegible] with a small number of mechanical parts. Its first cost is also [illegible] moderate, as compared with the method of raising water from g[illegible] depths by a series of 40 or 50 fm. lifts. Its practical value wa[illegible] tested in 1867 by the award of a silver medal by the Royal Falm[illegible] Polytechnic Society, which is composed chiefly of mining engine[illegible] In fact, these engines appear to solve a very important commer[illegible] question in mining operations—viz., the most economical and ef[illegible] tive means of deep mine drainage. Their success has been e[illegible] blished in the coal mines of Durham and Newcastle, and there is[illegible] reason why their adoption should not follow, as occasion requi[illegible] in the copper and tin mines of Cornwall, some of which are of gr[illegible] depth; and especially for foreign mines, where transport conve[illegible] ence and economy are of paramount consideration."

The "Special" Steam Pumping Engines are in use at the following among many other Collieries:—

Adelaide Colliery, Bishop Auckland	3 Pumps.	North Bitchburn Colliery, Darlington	2 Pumps.	Stott, James and Company, Burslem	1 Pum
Acomb Colliery, Hexham	1 „	Newton Cap Colliery, Darlington	1 „	Straker and Love, Brancepeth Colliery	1 „
Blackfell Colliery, Gateshead	1 „	Normanby Mines	1 „	Seaton Delaval Coal Colliery, near Newcastle	1 „
Black Boy Colliery, Gateshead	1 „	Oakenshaw Colliery	1 „	Thornley Colliery, Ferryhill	2 „
Castle Eden Colliery	2 „	Pease's West Colliery	2 „	Thompson, John, Gateshead	2 „
Carr, W. C., Newcastle	4 „	Pease, J. and J. W., near Crook	5 „	Trimdon Grange Colliery	1 „
Etherley Colliery	1 „	Pease, J. and J., Brandon Colliery	1 „	Tudhoe Colliery	4 „
Gidlow, T., Wigan	3 „	Pegswood Colliery, near Morpeth	2 „	Vobster and Mells Colliery	2 „
Haswell, Shotton and Easington Coal Company	3 „	Pelton Fell Colliery	1 „	Widdrington Colliery, Morpeth	5 „
Lochgelly Iron and Coal Company	2 „	Railey Fell Colliery, Darlington	1 „	Whitworth and Spennymoor Colliery	5 „
Lochore and Capeldrae Cannel Coal Company	6 „	Right Hon. Earl Durham, Fence Houses	1 „	Westerton Colliery, Bishop Auckland	1 „
Leather, J. T., near Leeds	2 „	Skelton Mines	1 „	Wardley Colliery, Gateshead	1 „
Lumley Colliery, Fence Houses	1 „	South Benwell Colliery	5 „	Westminster Brymbo Coal Company	2 „
Monkwearmouth Colliery, Sunderland	1 „	St. Helens (Tindale) Colliery	1 „	Weardale Coal and Iron Company	5 „

PARTICULARS OF THE "SPECIAL" STEAM PUMPING ENGINES SUITABLE FOR HIGH LIFTS IN MINES.

Diameter of Steam Cylinder ..... Inches	6	8	10	8	12	16	10	14	18	21	14	18	21	26	16	21	26
Diameter of Water Cylinder ..... Inches	3	3	3	4	4	4	5	5	5	5	6	6	6	6	7	7	7
Length of Stroke ..... Inches	24	24	36	24	36	48	24	36	36	48	36	36	48	72	36	48	48
Strokes per minute	30	30	20	30	20	15	30	20	20	15	20	20	15	10	20	15	15
Gallons per hour	2,200	2,200	2,200	3,900	3,900	3,900	6,100	6,100	6,100	6,100	8,800	8,800	8,800	8,800	11,900	11,900	11,900
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump	240	425	665	240	540	960	240	470	775	1,058	320	540	740	1,140	312	540	700
Diameter of Suction and Delivery ... Inches	2	2	2	3	3	3	3½	3½	3½	3½	4	4	4	4	5	5	5
Diameter of Steam Inlet ..... Inches	¾	1¼	1½	1½	2½	2½	1½	2½	3	3½	2½	3	3½	4	2½	3½	4
Diameter of Exhaust ..... Inches	1	1½	1¾	1½	2½	3	1¾	2½	3½	4	2½	3½	4	5	3	4	5

PARTICULARS, &c.—*Continued.*

Diameter of Steam Cylinder ..... Inches	30	18	24	30	32	18	24	30	36	21	30	36	42	26	36	44	50
Diameter of Water Cylinder ..... Inches	7	8	8	8	8	9	9	9	9	10	10	10	10	12	12	12	12
Diameter of Stroke ..... Inches	72	36	48	72	72	36	48	48	72	48	72	72	72	48	72	72	96
Strokes per minute	10	20	15	10	10	20	15	15	10	15	10	10	10	15	10	10	10
Gallons per hour	11,900	15,660	15,660	15,660	15,660	19,800	19,800	19,800	19,800	24,400	24,400	24,400	24,400	35,240	35,240	35,240	35,240
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump	1,100	300	540	840	960	240	427	665	960	264	540	780	1,062	282	540	800	1,080
Diameter of Suction and Delivery ... Inches	5	6	6	6	6	7	7	7	7	8	8	8	8	10	10	16	10
Diameter of Steam Inlet ..... Inches	5	3	4	5	5½	3	4	5	6	3½	5	6	7	4	6	8	8
Diameter of Exhaust ..... Inches	6	3½	5	6	6½	3½	5	6	7	4	6	7	8	5	7	9	10

PRICES OF THE ABOVE ON APPLICATION.

Any combination can be made between the Steam and Water Cylinders, to suit Height of Lift and Pressure of Steam.

TANGYE BROTHERS & HOLMAN, 10, Laurence Pountney Lane, London, E.C.

Printed by Richard Middleton, and published by Henry English (the proprietors), at their office, 26, Fleet Street, E.C., where all communications are requested to be addressed.—*August 16, 1873.*